


STATE OF NEW HAMPSHIRE

INTER-DEPARTMENT COMMUNICATION


FROM: Matt Urban
Chief, Operations Mgmt. Section

DATE: August 15, 2018
AT (OFFICE): Department of Transportation

SUBJECT: Dredge & Fill Application
Warren, 41738

TO: Bureau of Environment

Gino Infascelli, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the application package prepared by NH DOT Bureau of Bridge Design for the subject Major impact project. This project is classified as Major per Env-Wt 303.02(i). The project is located on NH Route 118 in the Town of Warren, NH. The proposed work consists of repairs to a slope that failed during the October 2017 storms. Repairs to the slope consist of constructing a soil nail stabilized Class A stone slope to restore & armor the eroded areas of embankment; downriver of the roadway-adjacent slope failure the treatment will transition to Class A stone with a keyed toe and then into placed boulders along and under the existing eroded vegetated slope. Replace a failing 18" cmp with a 24" cmp. The roadway will be reconstructed and repaved, with guardrail reinstalled at the top of embankment.

This project was reviewed at the Natural Resource Agency Coordination Meeting on July 18, 2018. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link:
<http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm>

The Department also completed a field review of this site with NHDES on August 9th 2018 to aid in the expedited review of this application and permit approval.

Mitigation is not required for this project. This is a restoration project that is addressing impacts that were a result of the October 2017 storms.

A payment voucher has been processed for this application (Voucher #539195) in the amount of \$2,928.60.

The lead people to contact for this project are Ron Grandmaison, Bureau of Highway Design (271-2731 or Ronald.Grandmaison@dot.nh.gov) or Matt Urban, Chief of Operations Management Section, Bureau of Environment (271-3226 or matt.urban@dot.nh.gov).

If and when this application meets with the approval of the Bureau, please send the permit directly to Matt Urban, Chief, Operation Management Section, Bureau of Environment.

MRU:mru
Enclosures
cc:
BOE Original
Town of Warren (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
Bureau of Construction
Carol Henderson, NH Fish & Game (via electronic notification)
Maria Tur, US Fish & Wildlife (via electronic notification)
Mark Kern, US Environmental Protection Agency (via electronic notification)
Michael Hicks, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)

S:\Environment\PROJECTS\WARREN\41738\Wetlands\WETAPP - Highway.doc



WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau Land Resources Management

Check the status of your application: www.des.nh.gov/onestop



RSA/Rule: [RSA 482-A/ Env-Wt 100-900](#)

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No:
			Check No:
			Amount:
			Initials:

1. REVIEW TIME: Indicate your Review Time below. To determine review time, refer to [Guidance Document A](#) for instructions.

☒ Standard Review (Minimum, Minor or Major Impact)

☐ Expedited Review (Minimum Impact only)

2. MITIGATION REQUIREMENT:

If mitigation is required a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if Mitigation is Required, please refer to the [Determine if Mitigation is Required Frequently Asked Question](#).

Mitigation Pre-Application Meeting Date: Month: 7 Day: 18 Year: 2018

☐ N/A - Mitigation is not required

3. PROJECT LOCATION:

Separate wetland permit applications must be submitted for each municipality that wetland impacts occur within.

ADDRESS: **NH 118**

TOWN/CITY: **Warren**

TAX MAP:

BLOCK:

LOT:

UNIT:

USGS TOPO MAP WATERBODY NAME: **Baker River**

☐ NA

STREAM WATERSHED SIZE:

☒ NA

LOCATION COORDINATES (If known): **43.953669, -71.856562**

☒ Latitude/Longitude ☐ UTM ☐ State Plane

4. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

Construction of a soil nail stabilized Class A stone slope to restore & armor eroded areas of embankment; downriver of the roadway-adjacent slope failure the treatment will transition to Class A stone with a keyed toe and then into placed boulders along and under the existing eroded vegetated slope. Replace a failing 18" cmp with a 24" cmp. The roadway will be reconstructed and repaved, with guardrail reinstalled at the top of embankment.

5. SHORELINE FRONTAGE:

☐ NA This does not have shoreline frontage.

SHORELINE FRONTAGE: **406 feet**

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the [Land Resources Management Web Page](#).

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Individual Sewerage Disposal per RSA 485-A:2	<input type="checkbox"/> YES <input type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Subdivision Approval Per RSA 485-A	<input type="checkbox"/> YES <input type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Shoreland Permit Per RSA 483-B	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	TBD _____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED

7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: **NHB 18 - 2100**

b. ☐ [Designated River](#) the project is in ¼ miles of: _____; and
date a copy of the application was sent to the [Local River Management Advisory Committee](#): Month: ____ Day: ____ Year: ____
☒ N/A

lrn@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

8. APPLICANT INFORMATION (Desired permit holder)LAST NAME, FIRST NAME, M.I.: **Ronald Grandmaison**TRUST / COMPANY NAME: **NH Dept. of Transportation**MAILING ADDRESS: **7 Hazen Drive**TOWN/CITY: **Concord**STATE: **NH**ZIP CODE: **03302**EMAIL or FAX: **Ronald.Grandmaison@dot.nh.gov**PHONE: **603-271-6198**ELECTRONIC COMMUNICATION: By initialing here: HSW, I hereby authorize NHDES to communicate all matters relative to this application electronically.**9. PROPERTY OWNER INFORMATION (If different than applicant)**LAST NAME, FIRST NAME, M.I.: **NH Department of Transportation**TRUST / COMPANY NAME: **NH Dept. of Transportation**MAILING ADDRESS: **P.O. Box 438**TOWN/CITY: **Concord**STATE: **NH**ZIP CODE: **03302**

EMAIL or FAX:

PHONE:

ELECTRONIC COMMUNICATION: By initialing here HSW, I hereby authorize NHDES to communicate all matters relative to this application electronically.**10. AUTHORIZED AGENT INFORMATION**

LAST NAME, FIRST NAME, M.I.:

COMPANY NAME:

MAILING ADDRESS:

TOWN/CITY:

STATE:

ZIP CODE:

EMAIL or FAX:

PHONE:

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

11. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail.



Property Owner Signature

Print name legibly

Date

RONALD GRANDMAISON

8/14/2018

lrn@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

MUNICIPAL SIGNATURES

12. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.



Print name legibly

Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

13. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.



Town/City Clerk Signature

Print name legibly

Town/City

Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

lm@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

14. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Scrub-shrub wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Emergent wetland	15 <input type="checkbox"/> ATF	6 <input type="checkbox"/> ATF
Wet meadow	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Intermittent stream	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Perennial Stream / River	3966 / 333 <input type="checkbox"/> ATF	1719 / 356 <input type="checkbox"/> ATF
Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Intermittent stream	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Perennial stream / River	7796 / 423 <input type="checkbox"/> ATF	1141 / 165 <input type="checkbox"/> ATF
Bank - Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Tidal water	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Salt marsh	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Sand dune	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland buffer	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Undeveloped Tidal Buffer Zone (TBZ)	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Previously-developed upland in TBZ	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Lake / Pond	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - River	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Tidal Water	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Vernal Pool	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
TOTAL	11777 / 756	2866 / 521

15. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of \$ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) 14643 sq. ft. X \$0.20 = \$ 2928.60

Temporary (seasonal) docking structure: _____ sq. ft. X \$1.00 = \$

Permanent docking structure: _____ sq. ft. X \$2.00 = \$

Projects proposing shoreline structures (including docks) add \$200 = \$

Total = \$ 2928.60

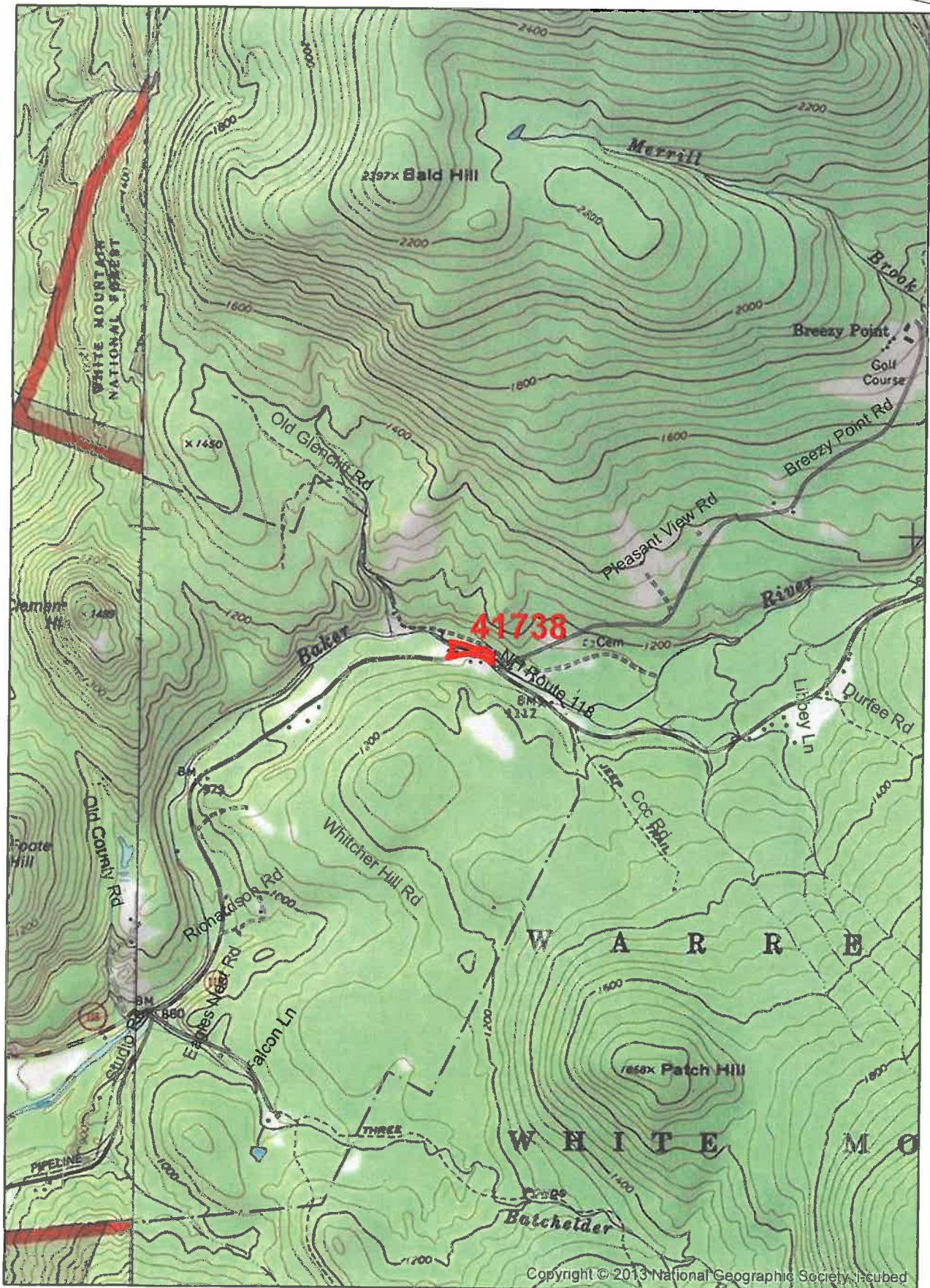
The Application Fee is the above calculated Total or \$200, whichever is greater = \$ 2928.60

lm@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

www.des.nh.gov

Warren 41738



0 0.25 0.5 1 Miles

1:24,000

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WARREN - NH-118

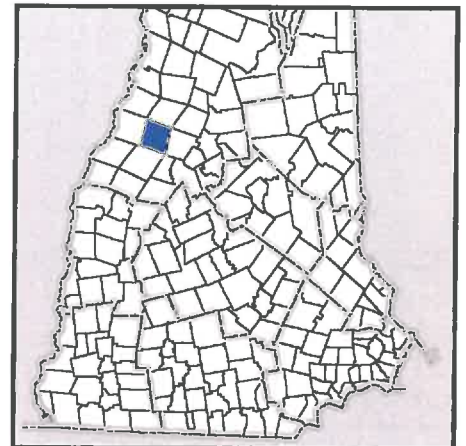


LEGEND

- Streams
- Water Bodies
- US Routes
- State Routes
- Interstates
- Local Roads
- Town Boundary

New Hampshire
DOT
Department of Transportation

State #: 41738
Federal #: X-A004(728)
LOCATION MAP





WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS
 Land Resources Management
 Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop



RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

The project need is to rehabilitate NH 118 and adjacent slope erosion along the Baker River to return the highway to a level of service comparable to that of before the October 2017 storm (major disaster declaration January 2, 2018).

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

Riverside slope erosion resultant from the October 2017 storm has encroached onto NH 118 reducing the highway to one usable lane for both directions (alternating one lane traffic). The project area is constrained by residential right-of-way on the other side of NH 118. Slope stabilization has been deemed the only feasible option and is the preferred alternative to restore the bank as well as to re-establish the full and safe travel way of NH 118.

The no build option would leave the slope in an unstable condition that would be susceptible to further erosion and result in the closure of NH 118. It is modeled that the stream over time will likely continue to erode until a stable 2:1 slope is reached which would put the top of bank of the Baker River at the yellow center line of NH 118 which would require NH 118 to be closed permanently.

Shifting the road away from the river through this section of NH 118 is not feasible at this time due to the severity of the slope instability and urgency to address the scoured slope prior to further failure, as well as the limited space to shift the road due to several residents along the southern side on NH 118.

lrn@des.nh.gov or (603) 271-2147

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3. The type and classification of the wetlands involved.

The wetlands identified near the project limits are R3UB12, PEM1E, PSS1E, R2UB12, and PFO1E. Impacts are anticipated to only be to R3UB12 and PEM1E wetlands.

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

The majority of impacts will be to the Baker River's channel and banks. To the south of NH 118 near Breezy Point Road there is a palustrine wetland that feeds an existing 18" cmp which outlets into the Baker River's bank on the other side of NH 118. Near the beginning of the project there is a gravel ditch line that runs along the southern edge of NH 118 that feeds a wetland near a driveway. A driveway pipe conveys water from the wetland to a stream that crosses NH 118 into a forested wetland north of 118 west of the project site.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

The Baker River has not been identified as a rare river. Nor will the project impact any rare wetlands, sand dunes, or tidal buffer area.

6. The surface area of the wetlands that will be impacted.

7796 sq. ft. of permanent and 1141 sq. ft. of temporary impact to non-wetlands (bank)

3966 sq. ft. of permanent and 1719 sq. ft. of temporary impact to riverine wetlands (channel)

15 sq. ft. permanent and 6 sq. ft. of temporary impacts to palustrine wetlands (PEM1E)

7. The impact on plants, fish and wildlife including, but not limited to:

- a. Rare, special concern species;
- b. State and federally listed threatened and endangered species;
- c. Species at the extremities of their ranges;
- d. Migratory fish and wildlife;
- e. Exemplary natural communities identified by the DRED-NHB; and
- f. Vernal pools.

The proposed project has been reviewed by the NH Natural Heritage Bureau (NHNHB), NH Fish and Game and the US Fish and Wildlife Service. The following findings are based on coordination with these agencies.

- a) NHNHB did not identify any rare or special concern species in the project area.**
- b) NHNHB did not identify any State listed threatened or endangered species in the project area. The US Fish and Wildlife Services IPaC tool the Northern Long-eared Bat (NLEB), a Federally listed endangered species, was identified as a species of concern in the area. A streamlined 4(d) consultation has been submitted to US Fish and Wildlife Services to coordinate review of potential project impacts of the project on NLEB. The project would not result in any prohibited take as the actions proposed are in accordance with the NLEB 4(D) rule.**
- c) There were no species at the extremities of their ranges identified in the project area by NHNHB or by the USFWS.**
- d) There were no migratory birds, fish or wildlife identified in the project area by NHNHB or by the USFWS.**
- e) NHNHB did not identify any exemplary natural communities in the project area.**
- f) Streams and surrounding wetlands were delineated by NHDOT on July 25, 2018, several wetland systems were identified in the project area, however, no vernal pools were observed. Project impacts are limited to the channel and bank of the Baker River and an adjacent palustrine wetland.**

8. The impact of the proposed project on public commerce, navigation and recreation.

The project will have a positive impact on public commerce, navigation and recreation in the area as it will greatly reduce the risk of further deterioration of NH 118 and prevent any subsequent closure of the highway if the slope was left untreated.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

The project will stabilize an existing previously eroded slope located along the northern edge of NH 118. The stabilization will consist of a Class A Stone Fill (Stone Fill with 50% of the mass having a minimum volume of 12 cubic feet), steel mesh and soil nail stabilization with vegetation establishment on the slope from elevations 2' above the ordinary high-water.

lrn@des.nh.gov or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

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10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

The project will require the acquisition of two right-of-way easement agreements associated with permanent impacts due to the bank stabilization and temporary impacts for construction access on the property. The property owners have been consulted during the design process and are verbally agreeable.

It is anticipated that the project will have a minimal impact on other public rights or accesses.

If stabilization and restoration efforts did not occur the road would likely need to be closed due to further deterioration of the road if further slope erosion occurred which would close NH 118 and cut off the upstream residents from access to the Warren Elementary School and to the Warren Fire Department. The smallest available detour is approximately 48 miles, and the nearest available emergency services would be from Woodstock.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

A developed parcel is located immediately downs stream of the eroded slope adjacent to NH 118. Some downgradient transfer of energy is anticipated from the stabilization; as such the NHDOT's proposed design continues slope stabilization beyond this property. The property owners have been consulted during the design process and are verbally agreeable to the bank stabilization along their property.

Upgradient impacts are not anticipated.

12. The benefit of a project to the health, safety, and well being of the general public.

Stabilization of the slope adjacent to NH 118 is deemed essential to the continued operation of the highway. Loss of the highway would be a hardship to the general population of the area, and could pose a health and safety hazard depending on the mechanism of future slope erosion if the stabilization were not completed.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

The project scope does not include drainage or stormwater adjustments (with the exception of minor grading and slope stabilization) nor will the amount of impervious area within the project limits increase therefore storm water will flow the same way it does today. As such, impacts to quantity or quality of surface and groundwater are expected to be minimal/negligible. Best Management Practices will be used to prevent adverse effects on water quality during construction.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

An increase to the base 100 year flood FEMA elevation is not anticipated based on the comparison of proposed project topography relative to available historic data (2012 LiDAR topography).

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

Slope stabilization efforts will in general maintain the existing channel shape, and are unlikely to adjust the overall momentum of river flow; however, adjustment of the river channel friction surface could lead to some transfer of energy. The project design has addressed the transfer of energy downgradient by including additional downstream bank stabilization.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

The work consists of the stabilization and restoration of the bank of the Baker River along NH 118 due to the high flows during the October 2017 storm and state emergency. There are other areas of bank erosion along the Baker River, however to the best of the Department's knowledge this is the only location that is in need of the proposed restoration and stabilization due to it extremely close proximity to NH 118.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

The value of the wetlands will not be altered due to the proposed work. The proposed work is to restore the bank back to its condition prior to the storm and scour. The bank will continue to serve the function and value it did prior to the storm.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

This project is not located in or near any Natural Landmarks listed on the National Register.

19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

There are no areas named in an act of Congress or Presidential proclamation as national rivers, national wilderness areas, or national lakeshores that will be impacted as a result of this project.

20. The degree to which a project redirects water from one watershed to another.

This project as proposed will not redirect water from one watershed to another.

Additional comments

DRAFT

BUREAU OF ENVIRONMENT CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting

DATE OF CONFERENCE: July 18, 2018

LOCATION OF CONFERENCE: John O. Morton Building

ATTENDED BY:

NHDOT

Matt Urban
Sarah Large
Ron Crickard
Marc Laurin
Chris Turgeon
Ralph Sanders
Tim Mallette
Rebecca Martin
Ron Grandmaison
Jonny Findon-Henry
Zack Schmidt
Aaron Smart
Jacqueline Hozza
Tim Dunn
Jordan Parent
Mike Servetas
Wendy Johnson

ACOE

Mike Hicks

**Federal Highway
Administration**

******Jamie Sikora

EPA

Mark Kern

NHDES

Lori Sommer
Dale Keirstead

NHF&G

John Magee

**NH Office of Energy and
Planning**

*****Jennifer Gilbert
*****Samara Ebinger

**Consultants/Public
Participants**

Peter Walker
Jeremy Degler
Ben Martin

*****only attended Warren, #41738 presentation

******only attended Salem-Manchester, #13933A Presentation

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

June 20, 2018 Natural Resource Agency Meeting Minutes	2
Piermont District 2	2
Brentwood, #41892	2
Warren, #41738 (X-A004(728)).....	2
Salem-Manchester, #13933A (A004(435))	3

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

NOTES ON CONFERENCE:**June 20, 2018 Natural Resource Agency Meeting Minutes**

Finalization of the June Natural Resource Agency Meeting Minutes were discussed. No edits had been provided. The group agreed that since Gino Infascelli was not in attendance they would like Sarah Large to inquire with him. Subsequent to the meeting S.Large reached out to G. Infascelli asking that he review the minutes by Friday July 27th and that if she had not heard back from him by close of business Friday she would finalize the minutes. The minutes have been finalized.

Piermont District 2

Minutes have not been provided to date.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Brentwood, #41892

A summary of the existing condition and recent pipe failure was provided, namely that two existing 36" CMP culverts collapsed on March 24, 2018 and District replaced the culverts with two 24" HDPE on March 28, 2018 as a temporary fix until a permanent solution could be constructed. All agreed that preservation of the prime wetlands immediately downstream of North Road is required.

Two options for the replacement were presented by Tim Mallette: 1.) Two 56' long 48" diameter RCP culverts replaced at the same location or two 50'+ long 48" diameter placed at a skew to avoid impacts to one of the properties on the inlet end of the culverts. The proposed twin 48" RCP culverts will meet the 50 yr. design flood estimate, and this size has a calculated capacity to pass the 100 yr. storm without overtopping the road. The permanent impacts will be kept to the minimum required to construct within the occupied footprint. Tim explained that proper bedding of the culverts will be key for success, and headwalls will not be used due to the bearing capacity of underlying marine silts and clays.

Ralph Sanders expressed why the project needs to be completed by the early fall of 2018. The twin 24" HDPE are undersized and a prior 3" rain event caused minor flooding of North Road in the late spring.

Matt Urban requested the permit be expedited so the permit could be issued early October 2018.

The natural resource group agreed with moving quickly to have DES approve authorize the permit by early October 2018.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Warren, #41738 (X-A004(728))

J. Findon-Henry presented a power-point presentation to the group (presentation attached). In summary: The project area (NH 118 in Warren near Breezy Point) experienced significant damage and partial loss of function during a storm event listed as between October 29th and November 1th 2017 (Major Disaster Declaration approved on January 2, 2018).

The purpose of the project is to return this section of NH 118 to the pre-storm functionality. Currently the slope is untreated and generally sloped at greater than 2H:1V. There are concerns that further detrition

could lead to the closure of NH 118. A closure of NH 118 would likely lead to hardship for the surrounding area (approximately 48 mile detour within school and fire districts). The preferred design is to build a retaining wall at the toe of the slope and backfill to the highway using stone to stabilize the embankment. In order to construct the project small machinery will need to be in the river and some tree removal will be required.

- C. Turgeon: Portions of NH 118 were repaired by NHDOT maintenance crews in November 2017; however, the slope repair area located adjacent to Breezy Point (41738 Project area) were considered beyond the scope of NHDOT maintenance crews.
- J. Findon-Henry: The 41738 Warren Project experienced funding delays which have contributed to overall project delays.
- General discussion involving the upstream and downstream impacts. It was noted that the objective of the project is to protect the NHDOT asset.
- M. Urban asks if mitigation can be waived since this is a declared emergency and project purpose is to return comparable service. L. Sommer would like some elaboration on the extent of the impacts and will follow up on whether or not mitigation is required. NHDOT will provide updated plans with subsequent wetland submittals.
- NHDOT: Current plan is to pursue a permit for the preferred design through the standard application process with priority being given during the application review process.
- A request to involve Jaimie Sikora (Federal Highway Representative) early on in the project since it is a Federal project was made.
- General discussion: It is likely that some tree removal will be required to facilitate Construction.
- J. Magee made a suggestion to look at other access points to see which would be the most reasonable.
- R. Martin provided an overview of the floodway and flood planes. If the proposed construction were to raise the current anticipated 100 year base flood elevation then a CLOMR would be needed. General consensus from the design team is that the proposed design will not likely increase the 100 year flood elevation. J Findon-Henry will calculate the anticipated net cross-sectional area adjustment value.
- S. Large on behalf of A. Lamb (Division of Resources and Economic Development – National Heritage Bureau) – No National Heritage Bureau concerns.

This project has not been previously discussed at the Monthly Natural Resource Agency Coordination Meeting.

Salem-Manchester, #13933A (A004(435))

Pete Walker presented the overview of the I-93 lane widening project (3 to 4 lanes) from Exit 1 in Salem to the border with Massachusetts (Contract A). Topics covered included a description of the project (1.7 miles, minor ramp modifications, northbound noise barrier near Haigh Avenue, & stormwater BMPS). Several maps were shown detailing the current project footprint in comparison to the footprint which was previously permitted and described in the SEIS from 2010. Additionally, resource impacts were discussed (Policy Brook, a tributary to Harris Brook, NLEB, exemplary natural communities [swamp white oak floodplain forest], and RTE species [meadow garlic, river birch, American eel, redbfin pickerel, & spotted turtle]), and Pete Walker stressed that coordination with the resource agencies would be ongoing. The possibility of adding a stormwater basin on the southbound side of I-93 with the inclusion of a stream relocation of the tributary to Harris Brook was also discussed. The presentation ended with a description of potential stream & wetland impacts; wetland impacts resulting from Contract A would be substantially decreased from the level of impact anticipated in the previous I-93 wetlands permits. Specifically, under the current plan, total wetland impacts would decrease from approximately 3.9 acres to less than 0.5 acre. Stream channel impacts would also be reduced from 3,549 linear feet (2004 FEIS) to about 3,200 linear

Warren, #41738 Mitigation Summary

The Department is proposing restoration of the significantly scoured bank of the Baker River that failed during the October 2017. During the August 9th, 2018 field visit to the site, Gino Infascelli (DES) was in agreement that the work as proposed is restoration by design and that expedited action is needed due to the significant damage caused by the October storm. It was determined that mitigation was not needed.

The urgent need to restore the bank of the Baker River back to a stable state is due to its immediate proximity to NH 118 and the imminent threat that an unstable slope has on the safety of the traveling public. If the slope continues to fail we will lose the roadway.



New Hampshire Natural Heritage Bureau

To: Rebecca Martin
7 Hazen Drive
PO Box 483
Concord, NH 03302

Date: 7/6/2018

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 7/6/2018
NHB File ID: NHB18-2100

Applicant: Rebecca Martin

Location: Tax Map(s)/Lot(s):
Warren

Project Description: 41738: The purpose of this project is to rehabilitate an existing sloped riverbank located adjacent and between NH 118 and the Baker River in Warren, NH. The riverbank and adjacent NH 118 experience significant erosion during a storm event between October 29 and November 1, 2017 (major disaster declaration on January 2, 2018). NH 118 is presently operating on two directional one way alternating traffic as a result of significant loss of the paved area during the storm. The need is to limit further riverbed erosion and deterioration of NH 118 and to return NH 118 to a serviceability level comparable to that prior to the storm. Preferred action is to construct an approximately 4'-7' tall retaining wall with a 1.5H:1V Stone lined backslope to be located between the Baker River and NH 118. The retaining wall will likely be located at or near the existing shoreline and will be dowelled into existing bedrock and will be approximately 150' in length, with approximately 50' sections of stone lined slope both upgradient and downgradient of the wall location. The wall will be constructed using small to medium sized tracked excavators located at the toe of the eroded slope extending into the shoreline, in addition to other construction equipment from the top of the slope (adjacent to NH 118).

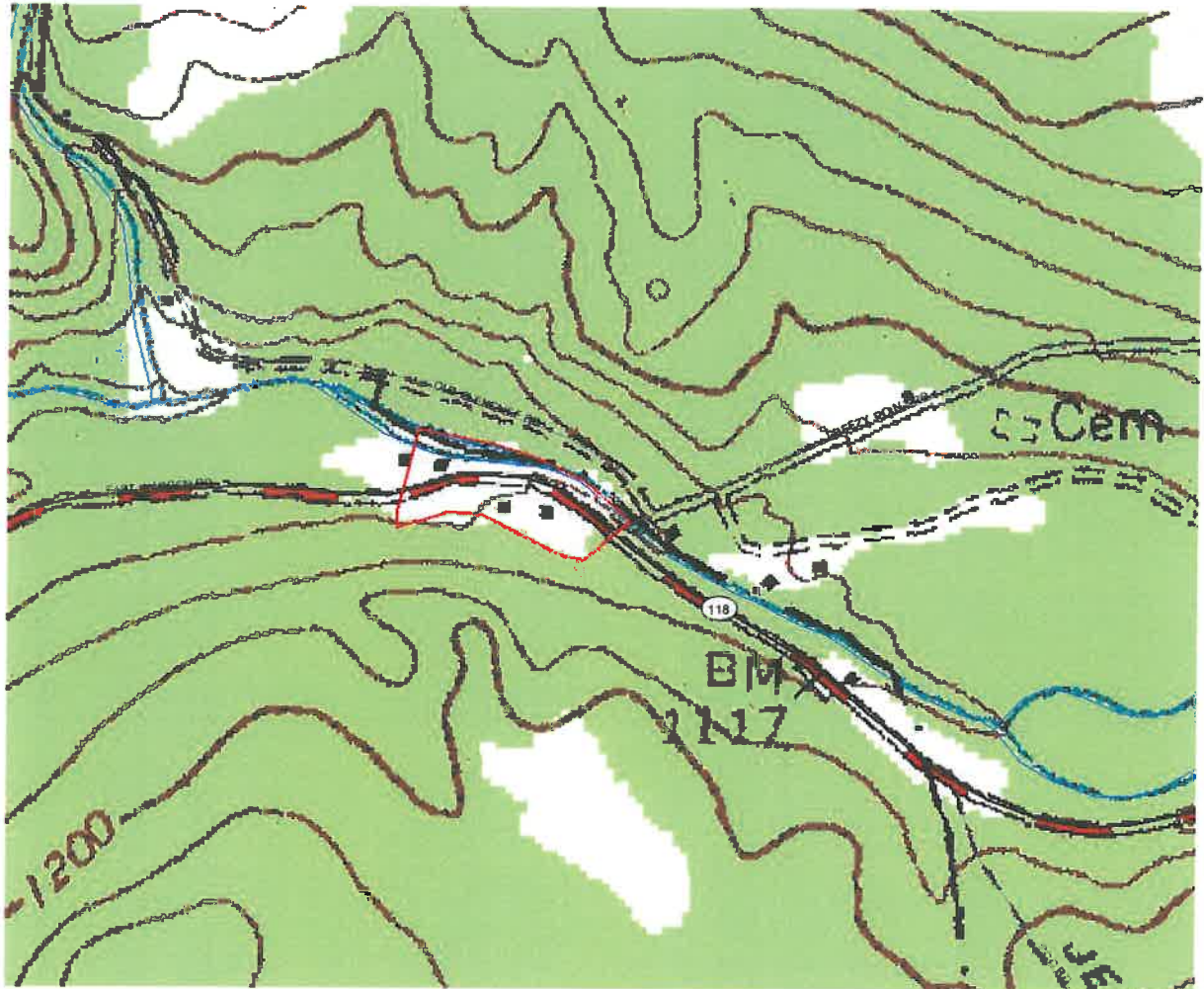
The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

This report is valid through 7/5/2019.



MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB18-2100





United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
<http://www.fws.gov/newengland>

In Reply Refer To:

July 06, 2018

Consultation Code: 05E1NE00-2018-SLI-2297

Event Code: 05E1NE00-2018-E-05364

Project Name: 41738 Warren

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2297

Event Code: 05E1NE00-2018-E-05364

Project Name: 41738 Warren

Project Type: TRANSPORTATION

Project Description: The purpose of this project is to rehabilitate an existing sloped riverbank located adjacent and between NH 118 and the Baker River in Warren, NH. The riverbank and adjacent NH 118 experienced significant erosion during a storm event between October 29 and November 1, 2017 (major disaster declaration on January 2, 2018). NH 118 is presently operating on two directional one way alternating traffic as a result of significant loss of the paved area during the storm. The project is needed to limit further riverbed erosion and deterioration of NH 118 and to return NH 118 to a serviceability level comparable to that prior to the storm. The preferred action is to construct an approximately 4'-7' tall retaining wall with a stone lined back slope to be located between the Baker River and NH 118. The retaining wall will likely be located at or near the existing shoreline and will be dowelled into existing bedrock and will be approximately 150' in length, with approximately 50' sections of stone lined slope both up gradient and down gradient of the wall location. The wall will be constructed using small to medium sized tracked excavators located at the toe of the eroded slope extending into the shoreline, in addition to other construction equipment from the top of the slope (adjacent to NH 118). Concurrent construction from both the top and bottom of slope will facilitate continued two directional one way alternating traffic on NH 118 during construction.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/43.95350602615162N71.8567249852203W>



Counties: Grafton, NH

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

IPaC Official Species List Consultation Code: 05E1NE00-2018-SLI-2297

Information to Determine 4(d) Rule Compliance:

YES NO

1. Does the project occur wholly outside of the WNS Zone ¹ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Have you contacted the appropriate agency ² to determine if your project is near known hibernacula or maternity roost trees?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

You are eligible to use this form if you have answered yes to question #1 or yes to question #2 and no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

Agency and Applicant³ (Name, Email, Phone No.): NH DOT, Rebecca Martin, Rebecca.martin@dot.nh.gov , 603-271-6781

Project Name: Warren 41738

Project Location (include coordinates if known): NH Route 118 near Breezy Point Road in Warren

-71.856619 43.953684 Decimal Degrees

Basic Project Description (provide narrative below or attach additional information):

The Warren 41738 project proposes to rehabilitate a sloped riverbank located adjacent and between NH Route 118 and the Baker River in Warren, NH. The riverbank and adjacent NH Route 118 experienced significant erosion during a storm event that occurred between October 29th and November 1st of 2017. There was a major disaster declaration for the storm events on January 2nd of 2018. NH Route 118 is presently operating on two directional one way alternating traffic as a result of significant loss of the paved area during the storm. The project is needed to limit further erosion and deterioration of NH Route 118 and to return NH Route 118 to a serviceability level comparable to prior to the storm. The preferred alternative is to construct an approximately 4'-7' tall retaining wall with a stone lined back slope to be located between the Baker River and NH 118. The retaining wall would likely be located at or near the existing shoreline and will be anchored into existing bedrock

¹ <http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

² See <http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html>

³ If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

and would be approximately 130 feet in length, with sections of stone lined slope both up gradient and down gradient of the wall location. Riprap is proposed to be installed upstream and downstream of the wall to provide protection for the wall and boulders would likely be installed in the Baker River channel at the base of the wall for added stability and protection. The wall is proposed to be constructed using small to medium sized tracked excavators located at the toe of the eroded slope extending into the shoreline, in addition to other construction equipment from the top of the slope and bottom of the slope to facilitate continued two directional one way alternating travel on NH Route 118 during construction. Some tree removal will be necessary for construction of the proposed project.

A temporary and small shift of NH Route 118 south may be needed to accommodate alternating one lane two-way traffic during construction. The buildings south of NH Route 118 would not be impacted by the small temporary shift. The project proposes either temporary and permanent easements on the property located north of NH Route 118 and west of the proposed wall location and/or to remove a manufactured house located west of the proposed wall. The manufactured home was built in 1995 and there was significant erosion in front of the house during the October 2017 storm event.

General Project Information	YES	NO
Does the project occur within 0.25 miles of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project include forest conversion ⁴ ? (if yes, report acreage below)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Estimated total acres of forest conversion	~1 acre	
If known, estimated acres ⁵ of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31 ⁶		
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action

⁴ Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).

⁵ If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.

⁶ If the activity includes tree clearing in June and July, also include those acreage in April to October.

agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: Ken M. S.

Date Submitted: 7/28/2018



Victoria F. Sheehan
Commissioner

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION



William Cass, P.E.
Assistant Commissioner

LETTER OF TRANSMITTAL

Date: 07/28/2018

TO: Susi von Oettingen
Endangered Species Biologist
US Fish and Wildlife Service
70 Commercial Street, Suite 300
Concord, NH 03301

Bureau: Environment
Project: Warren
Project No.: 41738
Consultation Code: 05E1NE00-2018-SLI-2297

Susi:

WE ARE SENDING YOU

☒ Attached

☐ Under separate cover via
the following items:

COPIES	DATE	DESCRIPTION
1	7/28/2018	NLEB 4(d) Rule Streamlined Consultation Form
1	7/28/2018	Project Location Map
1	7/28/2018	USFWS Official Species List

THESE ARE TRANSMITTED as checked below:

- ☒ For approval
☐ For your use
☐ As requested
☐ For review and comment

- ☐ Approved as submitted
☐ Approved as noted
☐ Returned for corrections
☐ Returned for your use

REMARKS: Enclosed is the NLEB 4(d) Rule Streamlined Consultation Form and backup information for the above referenced project Warren 41738. The NHDOT has determined that this project may affect the NLEB, but that any incidental take of the NLEB resulting from the project as proposed is not prohibited by the final 4(d) rule. The lead Federal Agency is the Federal Highway Administration.

Your concurrence with this determination is requested. Please contact me if you have any questions.

Rebecca Martin
Senior Environmental Manager
Bureau of Environment, NHDOT
Room 160 - Tel. (603) 271-6781
Rebecca.martin@dot.nh.gov

Enc.

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

Date Reviewed: 7/26/2018

Project Name: Warren

State Number: 41738

FHWA Number: X-A004(728)

Environmental Contact: Rebecca Martin

DOT

Email Address: Rebecca.martin@dot.nh.gov

Project Manager: Ron Grandmaison

Project Description: The subject project on NH Route 118 in Warren proposes to rehabilitate a sloped riverbank located adjacent and between NH 118 and the Baker River in Warren, NH. The riverbank and adjacent NH 118 experience significant erosion during a storm event between October 29 and November 1, 2017 (major disaster declaration on January 2, 2018). NH 118 is presently operating on two directional one way alternating traffic as a result of significant loss of the paved area during the storm. The project is needed to limit further erosion and deterioration of NH 118 and to return NH 118 to a serviceability level comparable to that prior to the storm. The preferred alternative is to rehabilitate the eroded slope through the construction of an approximately 10'-15' tall Class A Stone Fill Slope supported with steel mesh facing and soil nailing. Soil nail facing shall consist of steel wire mesh with underlying erosion control matting and seed, approximately 425' in length, and located at or near the existing shoreline between the Baker River and NH 118. The wire mesh shall be held in place by the use of anchor bearing plates secured to the soil nails using hexagonal nuts or by welding. The project also includes repaving NH 118 and replacing guardrail within the project area. Concurrent construction from both the top and bottom of slope will facilitate continued two directional one way alternating traffic on NH 118 during construction. A temporary and small shift of NH 118 south may be needed to accommodate alternating one lane two-way traffic during construction. Neither the buildings south of NH 118, nor the landscape features or stone walls associated with the buildings would be impacted by the small temporary shift. The design team is currently evaluating removing (taking) a manufactured house located west of the proposed wall. The manufactured home was built in 1995 and there was significant erosion in front of the house during the October 2017 storm. The porch of the structure is currently hanging over the riverbank unsupported. The manufactured home shares a parcel (219-004-000) with two other buildings that are further west, an old wooden barn and a small cabin near the Baker River. Neither of these buildings would be impacted by the project as proposed.

Please select the applicable undertaking type(s):

<input type="checkbox"/>	1. Modernization and general highway maintenance <u>that may require additional highway right-of-way or easement</u> , and which is <u>not within the boundaries of a historic property or district</u> , including: Choose an item. Choose an item.
<input type="checkbox"/>	2. Non-historic bridge and culvert maintenance, renovation, or total replacement, <u>that may require minor additional right-of-way or easement</u> , and which is <u>not within the boundaries of a historic property or district</u> , including: Choose an item. Choose an item.
<input type="checkbox"/>	3. Historic bridge maintenance activities within the limits of existing right-of-way, including: Choose an item. Choose an item.
<input checked="" type="checkbox"/>	4. Stream stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions).

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

<input type="checkbox"/>	5. Construction of bicycle lanes and pedestrian walkways, sidewalks, shared-use paths and facilities, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons, not within the boundaries of a historic property or district.
<input type="checkbox"/>	6. Installation of bicycle racks, not within the boundaries of a historic property or district.
<input type="checkbox"/>	7. Recreational trail construction, not within the boundaries of a historic property or district.
<input type="checkbox"/>	8. Recreational trail maintenance when done on existing alignment.
<input type="checkbox"/>	9. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, not within the boundaries of a historic property or district, and no historic railroad features are impacted, including, but not limited to:
	Choose an item. Choose an item.
<input type="checkbox"/>	10. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements
<input type="checkbox"/>	11. Installation of Intelligent Transportation Systems.

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.

The project as proposed would not directly impact any buildings or historic districts eligible or potentially eligible for the National Register of historic places. The house that might be removed as part of this project is currently in danger of falling down the failing slope and was built in 1995. The older buildings on the property will not be impacted. The purpose of the project is to restore a stream bank that was eroded during the storm of October 2017 and will not significantly alter the aesthetics of the Baker River. The BOE Cultural Resource Program Specialist, Sheila Charles, has reviewed the project description, photos of the project area, and known archaeological sites in the vicinity of the project. Sheila Charles determined that there are no known archaeological resources in or adjacent to the area. Therefore, the project as proposed is a stream stabilization and restoration project and is not anticipated to affect historic resources.

NHDOT in-house projects: Please append photographs, USGS maps, design plans and as-built plans, if available, for review.

LPA projects: Please submit this Certification Form along with the Transportation RPR

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	No	NHDHR R&C # assigned?	Click here to enter text.
<div style="display: flex;"> <div style="width: 30%;">Please identify public outreach effort contacts; method of outreach and date:</div> <div> <u>Local public officials, emergency services, and the Warren Historical Society were contacted on July 12, 2018 by letter about the project. The letter requested information about cultural resources and about any local concerns that the project design team should be aware of. To date no responses have been received. State conservation/preservation groups (LCHIP, LCIP/CLS, and LWCF) have been contacted and have indicated that the project would not impact properties preserved by these groups/funds.</u> </div> </div>			

Finding: (To be filled out by NHDOT Cultural Resources Staff)

<input type="checkbox"/>	No Potential to Cause Effects	<input checked="" type="checkbox"/>	No Historic Properties Affected
This finding serves as the Section 106 Memorandum for your environmental documents, no further coordination is necessary.			
<input type="checkbox"/>	This project does <i>not</i> comply with Appendix B, and will continue under the Section 106 review process outlined in 36 CFR 800.3-800.7. Please contact NHDOT Cultural Resources Staff to determine next steps.		
NHDOT comments:			

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

The barn and cabin will not be impacted and a 50' buffer will be maintained for construction access.

h118d111
NHDOT Cultural Resources Staff

8/8/2018
Date

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption that an undertaking conforms to the types listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the Cultural Resources Programmatic Agreement among the Advisory Council on Historic Preservation, Federal Highway Administration, NH Department of Transportation, and the State Historic Preservation Office. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

If any portion of the undertaking is not entirely limited to any one or a combination of the types specified in Appendix B (with, or without a portion that is included as a type listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.



US Army Corps
of Engineers
New England District

U.S. Army Corps of Engineers
New Hampshire Programmatic General Permit (PGP)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to "work" include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See PGP, GC 5 regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, www.nhnaturalheritage.org , specifically the book <u>Natural Community Systems of New Hampshire</u> .		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	N/A	N/A
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X	
2.5 The overall project site is more than 40 acres.		X
2.6 What is the size of the existing impervious surface area?	N/A	
2.7 What is the size of the proposed impervious surface area?	N/A	
2.8 What is the % of the impervious area (new and existing) to the overall project site?	N/A	
3. Wildlife	Yes	No
3.1 Has the NHB determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require a NHB determination.)		X
3.2 Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"? (These areas are colored magenta and green, respectively, on NH Fish and Game's map, "2010 Highest Ranked Wildlife Habitat by Ecological Condition.") Map information can be found at: <ul style="list-style-type: none"> • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html. 	X	
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the PGP, GC 21?	N/A	N/A

4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?		X
5. Historic/Archaeological Resources		
If a minor or major impact project, has a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) been sent to the NH Division of Historical Resources as required on Page 5 of the PGP?**	N/A	N/A

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

** If project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.



Failed Slope - Facing East / Upstream from Underneath Mobile Home Along the River



Failed Slope – Facing and Moving East/ Upstream



Failed Slope – Facing and Moving East / Upstream



Failed Slope – Facing Southwest Towards NH-118



Failed Slope – Facing South Towards NH-118



Failed Slope – Facing Southwest Towards NH-118



Failed Slope – Facing South Towards NH-118



Failed Slope – Facing Southwest Towards NH-118



Failed Slope – Facing Southwest Towards NH-118



Failed Slope – Facing Southwest Towards NH-118



Failed Slope Just Past/ West of the Mobile Home – Facing Southwest



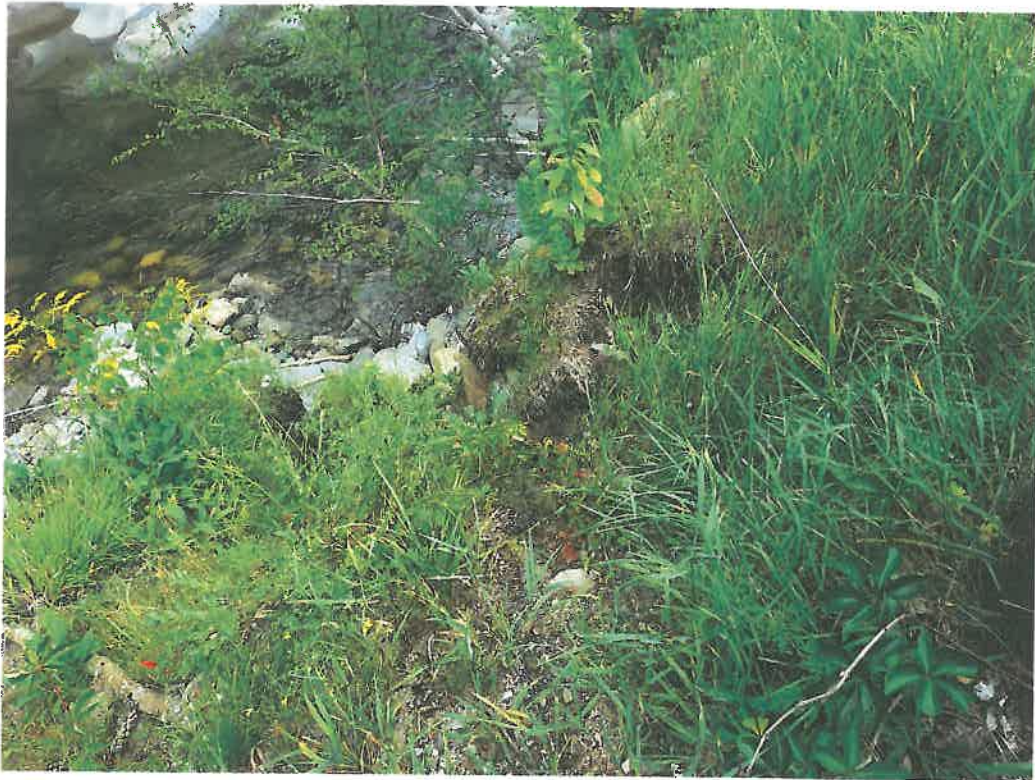
Below and Following Downstream from the Overhanging Tree the TECCO will end and boulder reinforcement will be placed underneath the intact/remaining vegetated bank



Bank Failure approximately 100 ft west of Breezy Point Road - Impact Area D & E



Bank Failure approximately 100 ft west of Breezy Point Road - Impact Area D & E



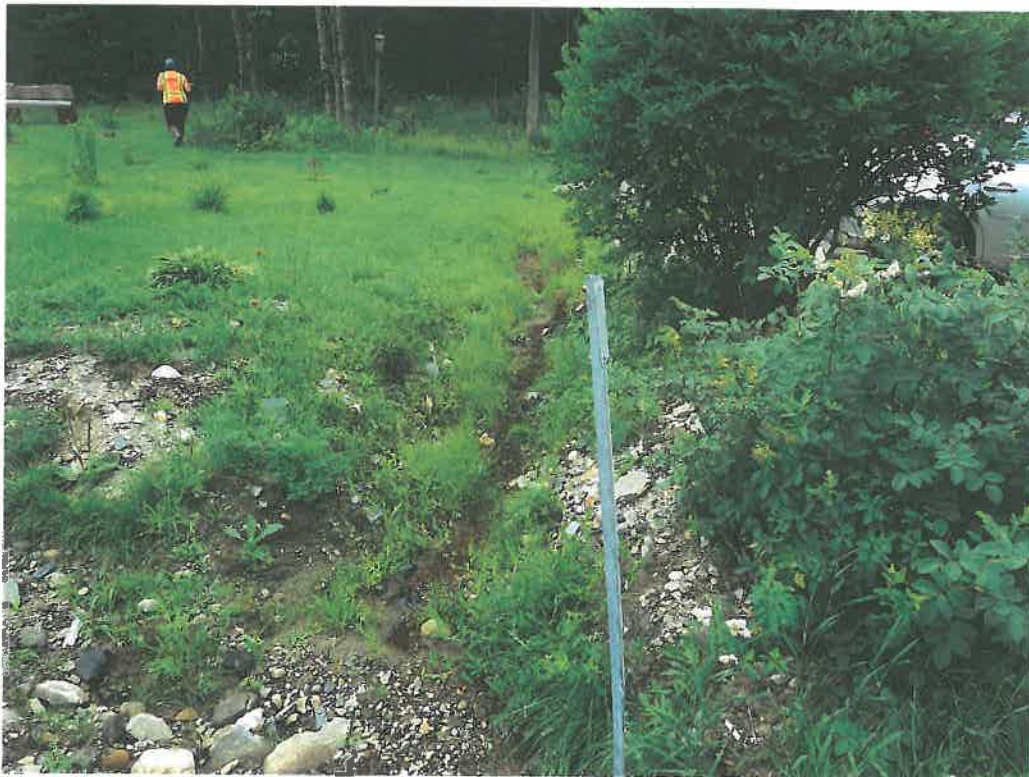
Bank Failure approximately 100 ft west of Breezy Point Road - Impact Area D & E



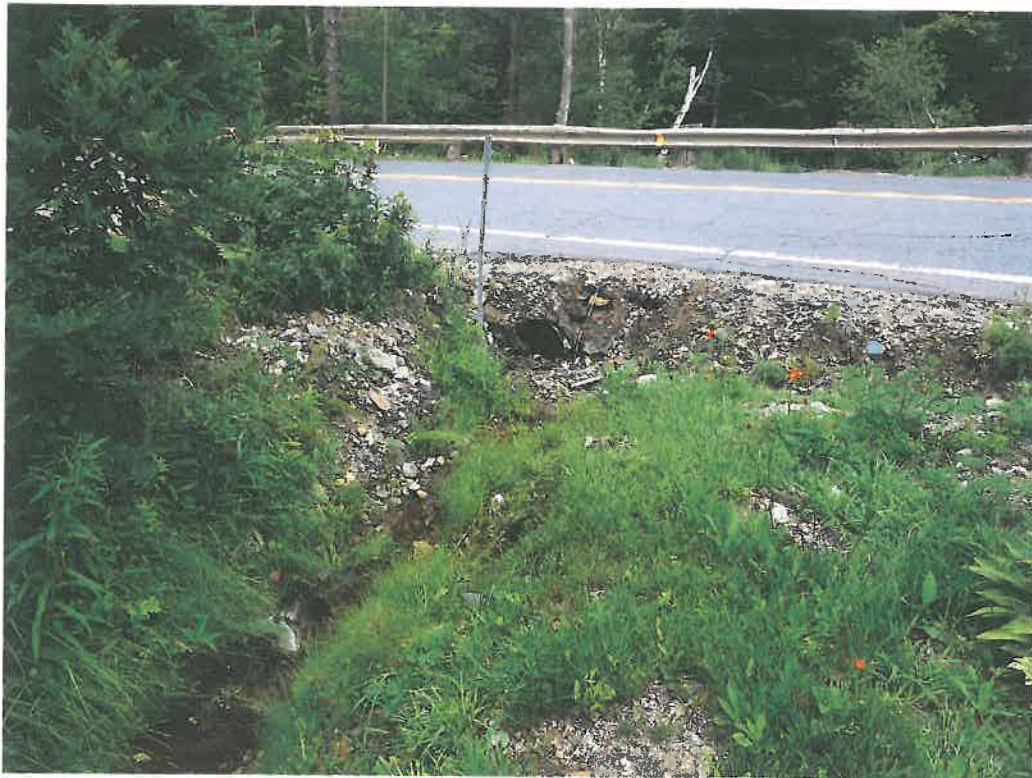
18" pipe outletting within bank of the river – Impact Area D & E



Inlet of 18" cmp fed by PEM1E



Inlet of 18" CMP – Impact Area F & G



Inlet of 18" CMP – Impact Area F & G



Mobile Home Immediately Adjacent to Baker River

Mobile home will be moved prior to construction and entire parcel available for access.



Barn to the Southwest of the Mobile Home



Cabin to the West of the Mobile Home



1.5 Story Home adjacent to bank scour and road loss along NH-118

Warren 41738 Construction Sequencing

- Remove & relocate existing home (to be done by the current home owner prior to construction)
- Install channel protection and perimeter control behind guardrail as well as around the limits of work area / easements.
- Construct temporary widening (with bituminous curb to facilitate and direct stormwater runoff during construction), paint temporary lane striping, place concrete barrier and install temporary signals to facilitate protected lane closure.
- Remove necessary guardrail from behind the barrier to allow for slope accessibility.
- Place sandbag water diversion structure within the river to divert flow away from the construction area. At a minimum this will likely cover the area adjacent from the disturbed area and the river.
- Construct temporary access road with perimeter control to allow access to the bottom of the slope. Note that this can be done at multiple locations within the easement area to expedite the construction process.
- Install slope stabilization in the form of Class A Stone Fill, steel mesh and soil nail stabilization with vegetation establishment on the slope from elevations 2' above the ordinary high-water. The treatment transitions to a keyed-at-toe Class A Stone Fill with repurposed river boulders, and then just repurposed river boulders laid along the existing slope, as shown in the Plans and Typical Details. Cross Sections have been included with the Plans for additional detail.
- District Maintenance forces will replace a failed 18" CMP at the eastern end of the Project with a 24" CMP. The culvert will have its inlet and outlet armored with stone, and will utilize a clean water bypass during construction. The culvert does not seem to pass water outside of storm events; best efforts will be taken to replace the pipe during a period of dry weather so as to avoid the issue of disturbing the water flow.
- Remove temporary access road and seed all disturbed areas.
- Replace the full guardrail run as shown on the Plans.
- Construct intermediate roadway detail (remove the temporary widening and bituminous curb, reestablish the roadside ditch line, and place 2" binder along the roadway).
- In the spring/summer of 2019 remove pavement placed in the winter, repave to final configuration and establish vegetation on slopes per the Notes on the Typical Details.

PART Env-Wt 404 CRITERIA FOR SHORELINE STABILIZATION

Env-Wt 404.01 Least Intrusive Method. Shoreline stabilization shall be by the least intrusive but practical method.

-The intent is to stabilize the slope with stone only to the length necessary (dependent on soil conditions/presence of bedrock) to prevent further erosion. All proposed construction falls within the original slope as estimated by the 2012 Granite Lidar data used as a reference.

Env-Wt 404.02 Diversion of Water. Diversion of stormwater run-off often provides effective and low maintenance erosion protection, and shall be used to the maximum extent practical.

-A water diversion structure will be used to keep the construction area dry. Beyond that, BMP's will establish erosion control measures to provide protection to the site.

Env-Wt 404.03 Vegetative Stabilization.

(a) Natural vegetation shall be left intact to the maximum extent possible. If space and soil conditions allow, unstable banks shall be cut back to a flatter slope, seeded, and replanted with native, non-invasive trees and shrubs.

-All impacted soils will be graded to a flatter slope than the existing steep scoured slope, ranging from 1.5H:1V to 2H:1V. The riprapped slope will be reseeded 2' above the ordinary highwater elevation, as well as the upper portions of the armored slope where it ties back into the properties above the river.

(b) If space relative to the highest observable tide line, water turbulence, and soil conditions allow, the project shall include vegetation of existing sand beach or dunes or construction of vegetated sand dunes.

-Does not apply to this project area.

Env-Wt 404.04 Rip-rap.

(a) Rip-rap applications shall be considered only where the applicant demonstrates that anticipated turbulence, flows, restricted space, or similar factors render vegetative and diversion methods physically impractical.

-Class A stone is proposed for the slope armoring overtop a geotextile matting, due to the concern for further slope erosion should the river's water level swell during another storm event. Class A stone was chosen to be more resistant to shifting when under high velocity water flow or when struck by objects moving down the river.

(b) Applications for rip-rap shall include:

(1) Designation of a minimum and maximum stone size;

-Class A

(2) Gradation;

-Class A: 50% 12CF, 30% 3CF-12CF, 10% 1CF-3CF, and 10% spalls.

(3) Minimum rip-rap thickness;

-Class A: 3 foot thickness

(4) Type of bedding for stone;

-Overtop geotextile matting

(5) Cross-section and plan views of the proposed installation;

-Provided with the plans

(6) Sufficient plans to clearly indicate the relationship of the project to fixed points of reference, abutting properties, and features of the natural shoreline; and

-Provided with the plans

(7) A description of anticipated turbulence, flows, restricted space, or similar factors that would render vegetative and diversion methods physically impractical.

- Slope stabilization efforts will in general maintain the existing channel shape, and are unlikely to adjust the overall momentum of river flow; however, adjustment of the river channel friction surface could lead to some transfer of energy. The project design has addressed the transfer of energy downgradient by including additional downstream bank stabilization.

(c) Applications to use rip-rap adjacent to great ponds or water bodies where the state holds fee simple ownership shall include a stamped surveyed plan showing the location of the normal high water shoreline and the footprint of the proposed project.

-Plans included with the application.

(d) Rip-rap shall be located shoreward of the normal high water shoreline, where practical, and shall not extend more than 2 feet lakeward of that line at any point.

-Not applicable in this case as the impacts are to the Baker River.

(e) Stamped engineering plans shall be provided as part of any application for rip-rap in excess of 100 linear feet along the bank of a stream or river.

-Plans included with the application.

SECTION 585 -- STONE FILL**Description**

1.1 This work shall consist of furnishing and placing a dense stone fill at the locations shown on the plans or ordered. Stone Fill is typically required for stability of embankment fill and soil cut slopes steeper than 2 horizontal to 1 vertical, although slopes at a flatter grade with water seepage or subject to submergence, such as in water quality treatment basins, could require stone fill. Stone fill is also used for erosion protection at pipe outlets, in drainage channels and for other drainage structures where expected water flows and velocities may require it.

Materials

2.1 Stone for stone fill shall be approved quarry stone, or broken rock of a hard, sound, and durable quality. The stones and spalls shall be so graded as to produce a dense fill with a minimum of voids.

2.1.1 Class A stone shall be irregular in shape with approximately 50 percent of the mass having a minimum volume of 12 ft³, approximately 30 percent of the mass ranging between 3 and 12 ft³, approximately 10 percent of the mass ranging between 1 and 3 ft³, and the remainder of the mass composed of spalls.

2.1.2 Class B stone shall be irregular in shape with approximately 50 percent of the mass having a minimum volume of 3 ft³, approximately 40 percent of the mass ranging between 1 and 3 ft³, and the remainder of the mass composed of spalls.

2.1.3 Class C stone shall consist of clean, durable fragments of ledge rock of uniform quality, reasonably free from thin or elongated pieces. The stone shall be made from rock which is free from topsoil and other organic material. The stone shall be graded as follows:

Sieve Size	Percentage by Weight Passing
12 in	100
4 in	50 - 90
1-1/2 in	0 - 30
3/4 in	0 - 10

2.1.4 Class D stone shall conform to Table 520-3 - Coarse Aggregate, Standard Stone Size No. 467.

2.1.5 Spalls for filling voids shall be stones or broken rock ranging downward from a maximum size of 1 ft³.

2.2 Gravel blanket material shall conform to 209.2.1.2.

2.3 Geotextile shall conform to Section 593.

Construction Requirements

3.1 Stones and spalls for stone fill shall be deposited and graded to eliminate voids and obtain a dense mass throughout the course. The spalls shall be tamped into place using an equipment bucket or other approved method.

3.1.1 When stone fill is placed on a slope, the stones shall be deposited in such a manner as not to dislodge the underlying material unnecessarily.

3.1.2 When stone fill is placed on a geotextile, it shall be deposited in a manner to maintain the integrity of the geotextile.

3.2 When gravel blanket is shown or ordered, the gravel shall be placed in layers not exceeding 12" in depth unless otherwise ordered.

3.3 The completed surface shall approximate the lines and grades shown or ordered. When ordered, stone placed over 1 ft. outside or above such lines and grades shall be removed.

3.4 Stone fill (Bridge) shall be placed within the limits shown on the plans.

Method of Measurement

4.1 Stone fill will be measured by the cubic yard and in accordance with 109.01.

Basis of Payment

5.1 The accepted quantity of stone fill of the class specified will be paid for at the Contract unit price per cubic yard complete in place.

5.2 Gravel blanket material specified or ordered will be paid for under Section 209.

5.3 Geotextile specified or ordered will be paid for under Section 593.

5.4 The accepted quantity of excavation required for placing stone fill and for placing any underlying gravel blanket will be paid for under the item of excavation being performed. Excavation herein refers only to excavation of original ground or to material ordered removed not shown on the plans.

5.5 Free borrow will not be required to replace the accepted quantity of stone obtained from the excavation. However, when the plans do not call for borrow, but the quantity of material removed from excavation for use under this item requires the Contractor to furnish borrow to complete the work, such borrow will be subsidiary.

Pay items and units:

585.1	Stone Fill, Class A	Cubic Yard
585.2	Stone Fill, Class B	Cubic Yard
585.21	Stone Fill, Class B (Bridge)	Cubic Yard
585.3	Stone Fill, Class C	Cubic Yard
585.4	Stone Fill, Class D	Cubic Yard

August 10, 2018

SPECIAL PROVISION**SECTION 223 - SLOPE STABILIZATION BY SOIL NAILING****Item 223.2 Slope Stabilization by Soil Nailing****Description**

1.1 This work shall consist of designing and constructing drilled and grouted soil nails through a stone fill revetment with associated steel mesh facing. The Contractor is advised that nails will be anchored in both soil and bedrock. Use of the term "soil nail" throughout this specification is intended to refer to both. The Contractor shall furnish all plans, drawings, and design calculations, and all labor, material, and equipment required to design and construct the soil nail stabilization in accordance with this specification.

1.2 Soil Nail Contractor. Specialty Contractor requirements are specified in 3.1.

1.3 Soil Nail Design. The Contractor shall engage the services of a registered Professional Engineer licensed in the State of New Hampshire with geotechnical knowledge and experience to provide the appropriate stability analysis and design for stabilizing the slope, including but not limited to, soil nail size, lengths, inclination, vertical and horizontal spacing, pattern/distribution, facing and anchorage, erosion control, and any special construction requirements not otherwise contained herein. The Contractor's engineer shall be experienced in soil nail stabilization similar to the work specified herein for at least three completed projects over the past three years.

1.3.1 Verification and proof testing are included as specified in 3.9 and 3.10.

1.4 Subsurface Information. Available test boring logs and locations are included as part of this specification. The subsurface boring information does not purport to be representative of the materials which may exist between or outside the limits of the borings, or the groundwater conditions to be encountered during construction. The Contractor shall make such additional subsurface investigations and/or laboratory analyses as the Contractor deems necessary for successful design and installation of the soil nail stabilized slope. The costs of additional subsurface explorations and laboratory analyses will be paid through Item 1006.22, up to the dollar limit set in the proposal. Any additional costs beyond the specified limit are subsidiary.

Materials

2.1 Material Requirements and Certification. Materials shall be approved by the Engineer and shall be furnished new and without damage or defects. The Contractor shall submit a Certificate of Compliance for all materials used to construct this item in accordance with Section 106.04.

2.2 Solid Bar Soil Nails. Solid bars for grouted soil nails shall meet the requirements of AASHTO M31/ASTM A615 for Grade 60 or 75 steel bars, and ASTM A722 for Grade 150 steel. Bars shall be a minimum 1 inch diameter and continuous without couplings, splices or welds. Bars shall be new, straight, and undamaged, and shall be either deformed reinforcing bar with a sufficient threaded portion to allow proper attachment of the bearing plate and nut, or a continuous threaded rod such as Dywidag or Williams rod. If threads are cut into a bar, the Contractor shall verify that the bar meets the minimum capacity required at the threaded section.

2.3 Centralizers. A method and material not detrimental to the soil nail and grout shall be provided to centralize the nail in the grouted hole and provide a minimum 1 inch of grout cover around each bar. Centralizers shall be securely attached to the nail and sized to allow a) positioning of the nail within 1 inch of the center of the drill hole, b) tremie pipe insertion to the bottom of the drill hole, and c) grout to freely flow up the drill hole. Centralizers shall be installed at regular intervals not to exceed 8 feet along the length of the nail and a distance of 1.5 feet from each end of the nail.

2.4 Cement Grout. Grout shall be an approved bagged product or approved mix design in accordance with Section 520, and shall obtain a minimum 3-day compressive strength of 1,500 psi and a minimum 28-day compressive strength of 3,000 psi in accordance with AASHTO T 106. Water for grout shall be potable. Accelerators and expansive admixtures are not permitted.

2.5 Soil Nail Facing. Soil nail facing shall consist of steel wire mesh. The wire mesh shall be held in place by the use of anchor bearing plates secured to the soil nails using hexagonal nuts welded to the bearing plate. Alternative methods of attaching the anchor bearing plates to the bars may be submitted for approval.

2.5.1 Wire Mesh. Wire mesh shall be high strength rock fall mesh with a minimum wire diameter of 0.118 inch (3 mm). The mesh opening size shall be 2.56 inches or smaller. Alternative mesh configurations and materials may be submitted for approval.

2.6 Anchor Bearing Plates. Steel anchor bearing plates shall conform to AASHTO M183 or ASTM A572 Grade 50, or other approved material, and shall be able to sufficiently secure the wire mesh facing to the soil nails. Anchor bearing plates shall be compatible with the wire mesh provided.

2.7 Anchor Nuts. Hexagonal nuts used to secure the anchor bearing plates in place shall conform to AASHTO M 291.

2.8 Corrosion Protection. All system components including soil nail bars, wire mesh facing, anchor plates, anchor nuts, and other permanent elements shall be protected from corrosion by galvanizing in accordance with Section 550.2.9 or other approved method.

Construction Requirements

3.1 Soil Nail Contractor's Qualifications. Work shall not be started nor materials ordered until written approval of the Contractor's qualifications is given. The Engineer will approve or reject the Contractor's qualifications within 15 days after receipt of a complete submission, which shall include the following at a minimum:

3.1.1 The Soil Nail Contractor shall demonstrate experience on at least three permanent soil nail projects similar to the work specified herein within the past three years. A brief description of each project with the owner's name and current phone number shall be submitted.

3.1.2 The Soil Nail Contractor shall provide a superintendent with responsible supervisory experience on at least three soil nail projects completed successfully within the past three years. The superintendent shall be thoroughly experienced with the materials being installed along with the applicable standards and requirements for this work. A summary of the superintendent's experience shall be submitted for approval.

3.2 Work Plan Submittal Requirements. The Contractor shall submit a work plan, working drawings, and complete design calculations, stamped by a registered Professional Engineer licensed in the State of New Hampshire with geotechnical knowledge and experience, for approval in accordance with Section 105.02 a minimum of 15 days prior to beginning any slope stabilization and/or associated activity. The submittal shall include all details, dimensions, quantities, ground profiles and cross-sections necessary to construct the stabilized slope. The Contractor shall not begin construction or incorporate materials into the work until the submittal requirements are satisfied and found acceptable to the Engineer. Changes or deviations from the approved submittals shall be resubmitted for approval. No adjustments in contract time will be allowed due to incomplete submittals. The work plan shall include the minimum following information:

- a) A description and detail of the size, length and spacing of soil nails to be placed in order to achieve a minimum factor of safety of 1.3 for slope stability. The materials and components selected will meet a 75 year design life. Designs will include consideration of appropriate loadings, geometry, and material properties associated with the stone fill, native soils and bedrock, reinforcement connections, facing, and other design elements.
- b) Name and qualifications of on-site supervisors and drill operators assigned to the project.
- c) Description of the equipment and tools to be used including the manufacturer's specifications and catalog data for all drill rigs, grout pumps, drill bits, drill casing, grout placement pipes, and all other necessary tools.
- d) Description of the soil nail components, construction sequence and a schedule for the work.

- e) Method of soil nail installation, including drilling equipment, hole dimensions, tools, casing, drill bits, method of drilling, and methods of determining hole location and alignment. Contingencies for maintaining an open hole or dealing with obstructions.
- f) Procedures to perform the work while maintaining traffic as outlined in the contract documents.
- g) Details of the drilled and grouted soil nail bar, including details of centralizing the bar.
- h) A detail of the grouting procedure including methods and equipment for pumping grout, grout pressures, the grout mix design, which includes the brand and type of Portland cement, the source and gradation of the aggregates and the details of any proposed admixtures including the manufacturer, dosage and associated technical literature.
- i) Details of erosion control matting with grass seed and installation process.
- j) Details of wire mesh facing and installation process.
- k) Details of the anchor bearing plate installation and connection to the wire mesh.
- l) Details for removal of drill spoils in the work area.
- m) Verification and proof testing procedure.
- n) Other details requested by the Engineer or otherwise deemed necessary for successful completion of the work.

3.3 Coordination Meeting. A coordination meeting shall be held prior to initiating the slope stabilization soil nails and related work. The purpose of the meeting shall be to review all aspects of the construction work and to facilitate coordination between all parties involved. The coordination meeting shall take place after the Contractor has received approval of the work plan. Individuals attending the meeting shall include as a minimum the NHDOT Contract Administrator, NHDOT Materials & Research Bureau representative, Contractor, Soil Nail Contractor, and all other personnel deemed appropriate by the previously mentioned personnel.

3.4 General Installation Requirements.

3.4.1 The existing sloughed slope shall be reshaped prior to installation of the stone fill, nails or facing.

3.4.2 The Contractor shall select drilling equipment and methods suitable for the ground conditions while minimizing impacts to areas within and outside the work area. Excavation, filling, or operating equipment on the slope shall be minimized to avoid disturbing the slope. The Contractor shall only perform the minimum clearing that is necessary to install the soil nails and facing. All other clearing shall require approval.

3.4.3 The Contractor shall visit the site prior to any construction activities for the purpose of observing and documenting the pre-construction condition of the roadway and slope. The Contractor shall observe the conditions of the slope and existing roadway surface on a daily basis

for signs of ground movements. The Contractor shall immediately notify the Engineer if signs of movements such as sloughing, cracks or increased size of old cracks are observed. The Contractor shall immediately suspend drilling operations if ground subsidence is observed.

3.4.4 The Contractor shall provide a daily summary of soil nail installation progress at the end of each work day which details the length and number of soil nails installed, and grout volumes and pressures for all grouting conducted that day at each nail location.

3.4.5 The Contractor shall take any and all precautions necessary to ensure that the soil nails are installed to the required depth at the locations shown on the plans and described herein.

3.4.6 The construction sequence shall be in accordance with the Prosecution of Work and the approved work plan submittal.

3.4.7 Removal of cobbles, boulders, rubble, or debris encountered at or near the soil slope face during drilling shall be the responsibility of the Contractor. Should the removal of face protrusions result in a void, the Contractor shall backfill the void as directed by the Engineer.

3.5 The contractor shall install the soil nails to the limits shown on the work plan or as directed by the Engineer.

3.6 Materials Handling and Storage.

3.6.1 Materials shall be handled and stored to prevent contamination, corrosion or damage.

3.6.2 Cement shall be adequately stored to prevent moisture degradation and partial hydration. Cement that has become caked or lumpy shall not be used. Aggregates shall be stored and handled so that excessive saturation and the inclusion of foreign materials are prevented.

3.6.3 All steel bars and pipes shall be carefully handled and shall be stored on supports to minimize contact with the ground. Damage to the nail steel and/or the coatings as a result of abrasion, cuts, nicks, welds, and weld splatter shall be cause for rejection. Nail steel shall be protected from and sufficiently free of dirt, and other deleterious substances prior to installation.

3.7 Grouting Soil Nails. Drilled and grouted soil nails shall be installed per the Contractor's approved work plan and in accordance with the following.

3.7.1 The ground shall be drilled to the depth specified and the cuttings removed prior to installation of the bar.

3.7.2 The bar shall be inserted into the drillhole to the required depth in such a manner as to prevent damage to the drillhole, steel bar and coating.

3.7.3 Grout equipment shall produce a uniformly mixed grout free of lumps or unmixed cement. The grouting equipment shall be sized to enable the entire nail to be grouted in one

continuous operation. The mixer shall be capable of continuously agitating the grout during usage. Neat cement grout shall be screened to remove lumps.

3.7.4 The drillhole shall be grouted after installation of the nail bar. If approved by the Engineer, grouting prior to insertion of the nail bar may be allowed if neat cement grout is used and the nail bar is immediately inserted through the grout to the specified length without difficulty. The grout shall be injected at the lowest point of each drillhole with the drillhole filled in one continuous operation. Cold joints in the grout placement will not be allowed. The quantity of grout and the grout pressures shall be recorded for each soil nail. Grout pressures shall be controlled to prevent ground heave or fracturing.

3.7.5 A minimum of nine 2 inch cubes shall be molded and cured in accordance with AASHTO T 106 (ASTM C109) for each batch of grout. The soil nails shall remain undisturbed until the cubes have been tested by the Bureau of Materials & Research for conformance with 2.4.

3.7.6 During freezing weather conditions, grout shall not be allowed to freeze or partially freeze until fully cured.

3.8 Soil Nail Facing Installation. The soil nail facing shall be installed per the Contractor's approved work plan and in accordance with the following. The soil nail facing shall extend throughout the treatment area providing complete coverage and extending to 1 foot beyond the outside rows and columns of soil nails at a minimum, subject to adjustment by the Engineer.

3.8.1 Wire Mesh Installation. The wire mesh shall follow the contour of the slope face as much as possible. The soil nail stickup shall penetrate the wire mesh. The wire mesh shall be placed to present a smooth regular appearance and not have any folds, ridges or other irregularities showing because of improper installation. Shallow depressions to improve tension of the wire mesh shall be dug if required by the approved work plan. The wire mesh facing shall be spliced together into one continuous mat. Splices shall be completed with sufficient material overlap, so that no gaps exist between adjacent pieces. Splices shall be completed per the manufacturer's recommended method using materials that are compatible with and match in color with the wire mesh. Splices and overlaps are subject to approval.

3.8.2 Anchor Bearing Plate and Nut Installation. An anchor plate shall be installed on the soil nail after the wire mesh is installed over and around the soil nail. The anchor plate shall be seated against the wire mesh at the slope face. The anchor bearing plate shall be secured by an anchor nut installed on the threaded soil nail bar and welded, in accordance with the approved work plan.

3.9 Soil Nail Verification Testing. The Contractor shall perform verification testing prior to installation of production nails to confirm the appropriateness of the Contractor's drilling and installation methods and to verify the required nail pullout resistance. The testing procedure and acceptance criteria shall be as outlined in Section 9.4 of the Federal Highway Administration Publication FHWA-NHI-14-007 (FHWA GEC 007, February 2015) or other approved procedure.

3.9.1 Verification testing shall be performed in the presence of the Engineer by incrementally loading the test nail(s) to failure or a maximum test load specified by the Contractor's design engineer.

3.9.2 At least one satisfactory verification test shall be performed. The Contractor's design engineer shall review test results and submit to the Engineer for approval with a written certification that all design parameters have been met.

3.10 Soil Nail Proof Testing. The Contractor shall perform proof testing on at least one soil nail per row at locations determined by the Engineer. The testing procedure and acceptance criteria shall be as outlined in Section 9.4 of the Federal Highway Administration Publication FHWA-NHI-14-007 (FHWA GEC 007, February 2015) or other approved procedure.

3.10.1 Proof testing shall be performed in the presence of the Engineer by incrementally loading the test nail(s) to 150 percent of the design test load or other approved criteria.

3.10.2 The Contractor's design engineer shall review test results and submit to the Engineer for approval with a written certification that all design parameters have been met.

Method of Measurement

4.1 Slope stabilization by soil nailing will be measured by the square yard along the length and height of the treated slope face. The treated slope face is considered to include one foot of facing beyond the outer row/column of soil nails. No allowance will be made for facing splices, overlaps, or material wrapped below the toe of the stone fill slope.

Basis of Payment

5.1 The accepted quantity of slope stabilization by soil nailing will be paid for at the contract unit price per square yard, complete in place.

5.1.1 Payment shall be considered full compensation for all engineering, calculations, shop drawings, and plans associated with design of the slope stabilization, and for all labor, materials, equipment, and incidentals needed to construct the stabilized slope in accordance with this specification, including clearing, slope reshaping, soil nails, grouting, facing, anchoring, verification testing and proof testing.

5.1.2 Stone fill, humus, erosion control matting, and turf establishment will be paid separately.

5.2 Additional subsurface explorations and soil testing, if performed, will be paid for under Item 1006.22.

Pay items and units:

223.2	Slope Stabilization by Soil Nailing	Square Yard
-------	-------------------------------------	-------------

TEST BORING REPORT										BORING NO. B101		
STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION										SHEET NO. <u>1</u> OF <u>1</u>		
MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION										STA. <u>OFF.</u>		
PROJECT NAME WARREN 41738 BRIDGE NO. <u>N/A</u>										BASELINE <u>NH Rt 118</u>		
DESCRIPTION <u>Rt 118 emergency repairs</u>										ELEVATION (ft) <u>1088.6</u>		
GROUNDWATER					EQUIPMENT		SAMPLER		CASING		CORE	
DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE	S	NW	NN			
						SIZE I.D. (in):	1.375	3	1.875			
						HAMMER WT. (lb):	140	DRILL RIG				
						HAMMER FALL (in):	30	CME 45-C Trlr				
						HAMMER TYPE:	Automatic			EAST/NORTH (ft) <u>934305/529653</u>		
DEPTH (ft)	STRATUM CHANGE (ft)	DEPTH	ELEVATION	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (%)	DEPTH RANGE (ft)	FIELD CLASSIFICATION AND REMARKS				STRATUM SYMBOL
0	0.6	1087.6						-ASPHALT-				
								Tannish gray, Medium sandy COBBLES with boulders and gravel, trace silt				
								-GLACIAL OUTWASH-				
5												
10												
15	14.8	1073.8			C1	1.8 [31]	12.4	Tannish gray, Medium sandy COBBLES with boulders and gravel, trace silt				
	16.2	1072.4						RQD: 1.6 / 5.6 = 28% Gray gravelly SILT with sand				
								-BASAL TILL-				
								-APPROXIMATE BEDROCK SURFACE-				
20					C2	4.7 [97]	18.0	Hard, very slight weathering, sound, medium grained plagioclase-quartz-mica moderately foliated GRANODIORITE, moderately close horizontal joints				
								Hard, very slight weathering, sound, medium grained plagioclase-quartz-mica moderately foliated GRANODIORITE, moderately close horizontal joints RQD: 4.7 / 4.8 = 97%				
25							22.8	Bottom of Exploration @ 22.8 ft (El. 1065.6)				

Sampler Identification		COHESIVE SOILS		NON-COHESIVE SOILS		Soil Descriptions		Proportion	
		Blows/foot (N)	Consistency	Blows/foot (N)	Apparent Density	Capitalized Soil Name	Major Component		
S	Standard Split Spoon	0 - 1	Very Soft	0 - 4	Very Loose	Lower Case Adjective	35% - 50%		
SL	Large Spoon (O.D. = 3 in)	2 - 4	Soft	5 - 10	Loose	Some	20% - 35%		
T	Thin Wall Tube	5 - 8	Medium Stiff	11 - 30	Medium Dense	Little	10% - 20%		
U	Undisturbed Piston	9 - 15	Stiff	31 - 50	Dense	Trace	1% - 10%		
O	Open End Rod	16 - 30	Very Stiff	> 50	Very Dense				
A	Auger Flight								
C	Core Barrel	> 30	Hard						
NR	Not Recorded								

WCR - Weight of Rod
WCH - Weight of Hammer

ENGLISH

TB-12 S:\MATERIALS-RESEARCH\GINT\PROJECTS\WARREN\77045\WARREN-77049.GPJ 8/9/2018 8:10:14 AM TB-12

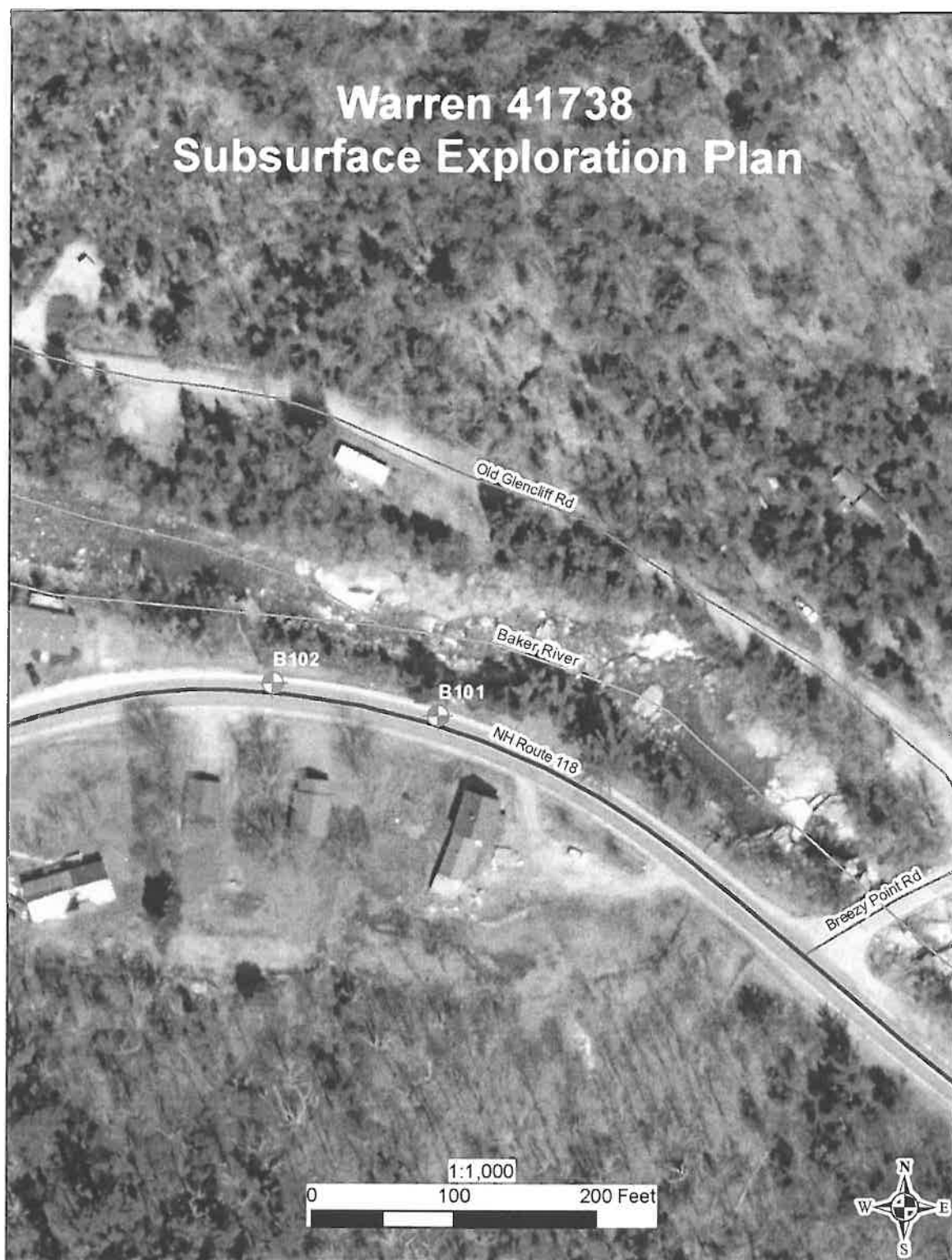
TEST BORING REPORT										BORING NO. B102	
STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION MATERIALS & RESEARCH BUREAU - GEOTECHNICAL SECTION										SHEET NO. 1 OF 1	
PROJECT NAME WARREN 41738 BRIDGE NO. N/A										STA. OFF.	
DESCRIPTION Rt 118 emergency repairs										BASELINE NH Rt 118	
GROUNDWATER						EQUIPMENT		SAMPLER		CASING	
DATE	TIME	DEPTH (ft)	ELEV. (ft)	BOTTOM OF CASING	BOTTOM OF HOLE	TYPE:	8	NW	NK		
						SIZE I.D. (in):	1.375	3	1.875		
						HAMMER WT. (lb):	140	DRILL RIG			
						HAMMER FALL (in):	30	CME 45-C Trlr			
						HAMMER TYPE	Automatic				
DEPTH (ft)	STRATUM CHANGE (ft)	BLOWS PER 0.5 ft	SAMPLE NUMBER	SAMPLER RECOVERY (%)	DEPTH RANGE (ft)	FIELD CLASSIFICATION AND REMARKS					STRATUM SYMBOL
0	0.8	1034.6				-ASPHALT-					
						Tannish gray, Medium sandy COBBLES with boulders and gravel, trace silt					
						-GLACIAL OUTWASH-					
5											
10											
15	15.9	1069.5			16.0	Gray gravelly SILT with sand					
	17.2	1066.2				-BASAL TILL-					
			C1	4.1 [82]		Gray gravelly SILT with sand					
						-APPROXIMATE BEDROCK SURFACE-					
20					21.0	RQD: 4.1 / 5.0 = 82% Hard, very slight weathering, sound, medium grained plagioclase-quartz-mica moderately foliated GRANODIORITE, moderately close horizontal joints					
						Bottom of Exploration @ 21.0 ft (El. 1064.4)					
25											

SAMPLER IDENTIFICATION		COHESIVE SOILS		NON-COHESIVE SOILS		Soil Descriptions		Proportion	
		Blows/foot (N)	Consistency	Blows/foot (N)	Apparent Density	Capitalized Soil Name	Major Component		
S	Standard Split Spoon	0 - 1	Very Soft	0 - 4	Very Loose	Lower Case Adjective	35% - 50%		
SL	Large Spoon (O.D. = 3 in)	2 - 4	Soft	5 - 10	Loose	Some	20% - 35%		
T	Thin Wall Tube	5 - 8	Medium Stiff	11 - 30	Medium Dense	Little	10% - 20%		
U	Undisturbed Piston	9 - 15	Stiff	31 - 60	Dense	Trace	1% - 10%		
O	Open End Rod	16 - 30	Very Stiff	> 50	Very Dense				
A	Auger Flight								
C	Core Barrel								
NR	Not Recorded								

WOF - Weight of Rod
WOH - Weight of Hammer

ENGLISH

TB-12 S&M MATERIALS-RESEARCH/INT/PROJECT/BN/ARREN/704C/11/13/17 8:10:15 AM TB-12

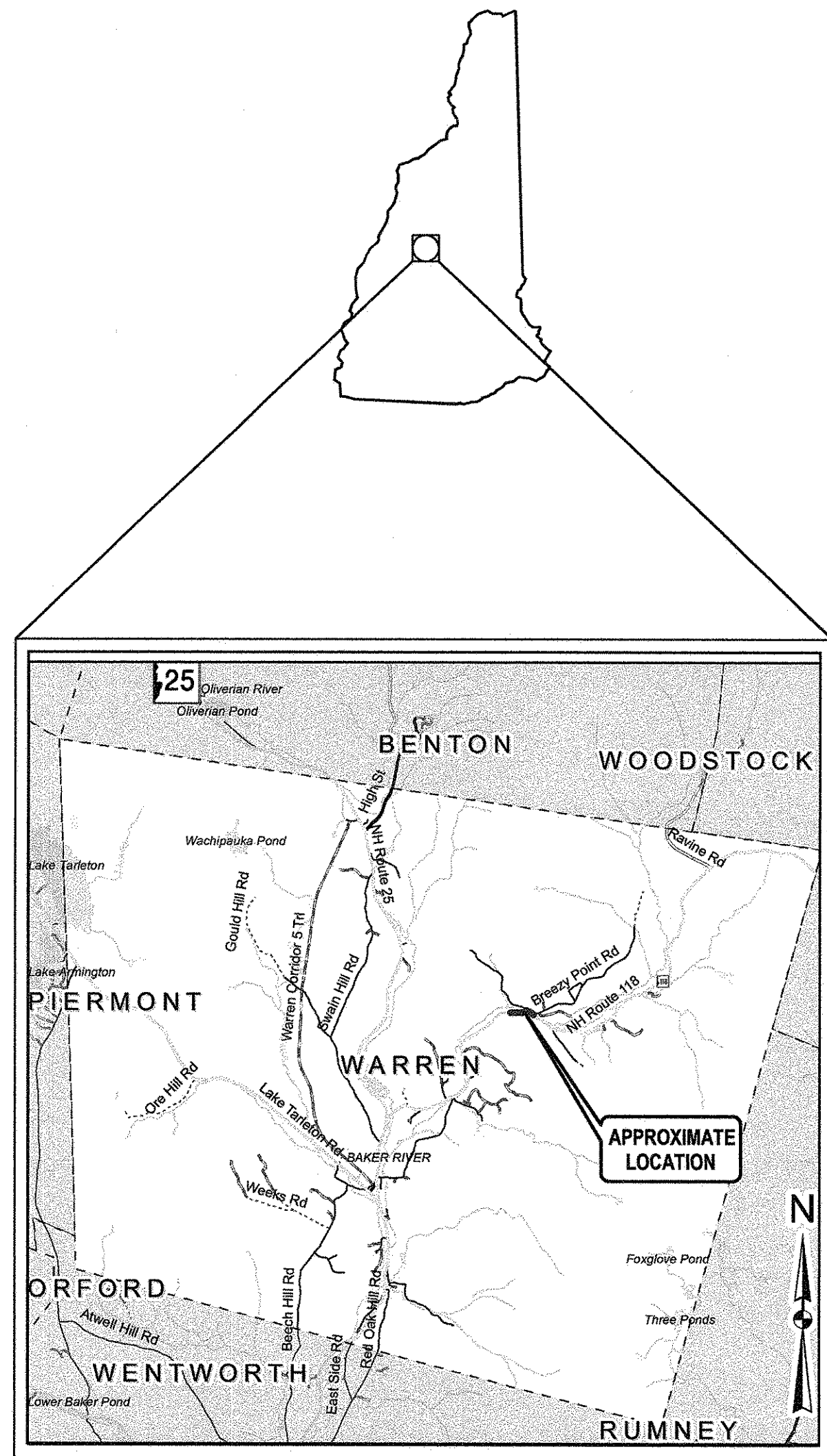


STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
WETLANDS PLANS
FEDERAL AID PROJECT

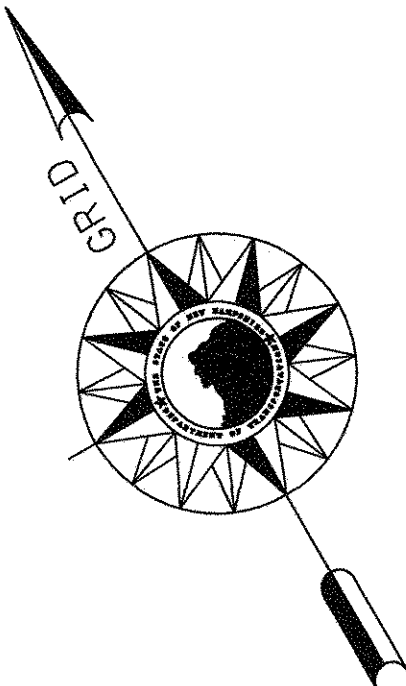
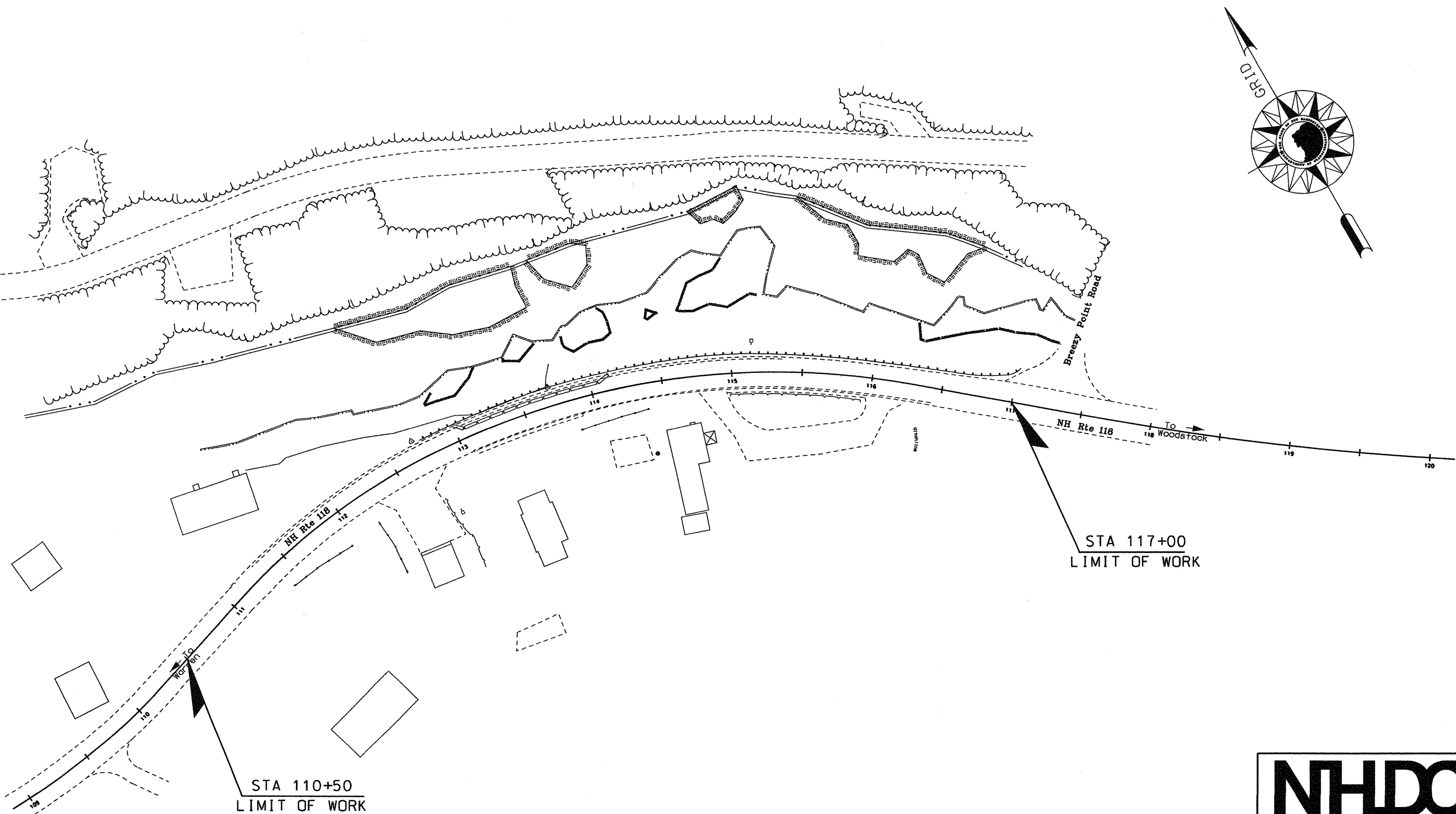
X-A004(728)
N.H. PROJECT NO. 41738
NH ROUTE 118

DESIGN DATA

AVERAGE DAILY TRAFFIC 20 13	680
AVERAGE DAILY TRAFFIC 20 17	545
PERCENT OF TRUCKS	UNKNOWN
DESIGN SPEED	40
LENGTH OF PROJECT	0.15 MILES



LOCATION MAP



TOWN OF WARREN
COUNTY OF GRAFTON

SCALE: 1" = 50'

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

INDEX OF SHEETS

- 1 FRONT SHEET
- 2-3 STANDARD SYMBOLS SHEETS
- 4-6 WETLAND IMPACT PLANS
- 7-9 EROSION CONTROL PLANS

WETLANDS DELINEATED BY REBECCA MARTIN
AND SARAH LARGE ON JULY 25, 2018

NHDOT THE STATE OF
NEW HAMPSHIRE
DEPARTMENT OF
TRANSPORTATION

RECOMMENDED FOR APPROVAL:

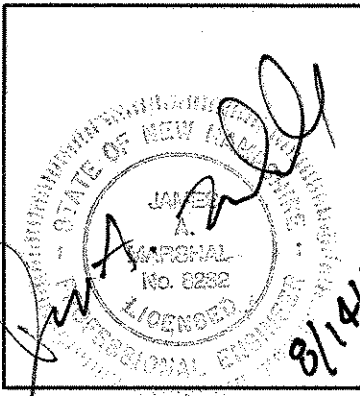
DIRECTOR OF PROJECT DEVELOPMENT

DATE

APPROVED:

ASSISTANT COMMISSIONER AND CHIEF ENGINEER

DATE



DRAWING NAME	FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738FSW	X-A004(728)	41738	1	9

GENERAL

EDGE OF PAVEMENT
TRAVELED WAY

PROPOSED ROADWAY

existing roadway

(pavement removed outside slope lines)

DRIVEWAYS

(label surface type)

BUILDINGS

(label house or type of building)

FOUNDATION

(label type)

LEACH FIELD

leach field

BRIDGE CROSSINGS

STREAM

OVERPASS

STEPS AND WALK

(label type)

INTERMITTENT WATER COURSE

SHORE LINE

river/stream

pond (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS)

(deciduous)(coniferous) (stump)

TREE OR STUMP (CROSS-SECTIONS)

(show station, circumference in feet & type)

HEDGE

(label type)

MONITORING WELL

mon

WELL

W

FLAG POLE

fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type)

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)

FENCE (LABEL TYPE)

SIGNS

(single post)

(double post)

GAS PUMP

FUEL TANK (ABOVE GROUND)

STORAGE TANK FILLER CAP

SEPTIC TANK

GRAVE

MAILBOX

VENT PIPE

SATELLITE DISH ANTENNA

PHONE

GROUND LIGHT/LAMP POST

BORING LOCATION

TEST PIT

INTERSTATE NUMBERED HIGHWAY

UNITED STATES NUMBERED HIGHWAY

STATE NUMBERED HIGHWAY

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE

DELINEATED WETLAND

ORDINARY HIGH WATER

TOP OF BANK

TOP OF BANK & ORDINARY HIGH WATER

NORMAL HIGH WATER

WIDTH AT BANK FULL

PRIME WETLAND

PRIME WETLAND 100' BUFFER

NON-JURISDICTIONAL DRAINAGE AREA

COWARDIN DISTINCTION LINE

TIDAL BUFFER ZONE

DEVELOPED TIDAL BUFFER ZONE

HIGHEST OBSERVABLE TIDE LINE

MEAN HIGH WATER

MEAN LOW WATER

VERNAL POOL

SPECIAL AQUATIC SITE

REFERENCE LINE

WATER FRONT BUFFER

NATURAL WOODLAND BUFFER

PROTECTED SHORELAND

INVASIVE SPECIES LABEL

INVASIVE SPECIES

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY

100 YEAR FLOODPLAIN BOUNDARY

FLOODWAY

ENGINEERING

CONSTRUCTION BASELINE

PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

CLEARING LINE

SLOPE LINE

SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:

ORIGINAL GROUND ELEVATION (LEFT)

FINISHED GRADE ELEVATION (RIGHT)

SHEET 1 OF 2

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
STANDARD SYMBOLS				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	41738s+dsymb1_2	41738	2	9

DRAINAGE

MANHOLE			
CATCH BASIN		(existing)	
DROP INLET			
DRAINAGE PIPE (existing)			(label size & type)
DRAINAGE PIPE (PROPOSED)			
UNDERDRAIN (existing) W/ FLUSHING BASIN			(label size & type)
UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN			
HEADER (existing & PROPOSED)			(with stone outlet protection)
END SECTION (existing & PROPOSED)			METAL or PLASTIC
OPEN DITCH (PROPOSED)			RCP
EROSION CONTROL/ STONE SLOPE PROTECTION			

BOUNDARIES / RIGHT-OF-WAY

	(label type)
RIGHT-OF-WAY LINE	— — — — —
RR RIGHT-OF-WAY LINE	— — — — —
PROPERTY LINE	— — — — —
PROPERTY LINE (COMMON OWNER)	— — — — —
TOWN LINE	— — — — — BOW CONCORD
COUNTY LINE	— — — — — COOS GRAFTON
STATE LINE	— — — — — MAINE NEW HAMPSHIRE
NATIONAL FOREST	— — — — —
CONSERVATION LAND	— — — — —
BENCH MARK / SURVEY DISK	— — — — —
BOUND	□ (PROPOSED)
STATE LINE/ TOWN LINE MONUMENT	□ S/L □ T/L
NHDOT PROJECT MARKER	△
IRON PIPE OR PIN	• ip
DRILL HOLE IN ROCK	• dh
TAX MAP AND LOT NUMBER	156 14 1642/341 6.80 Ac. ±
PROPERTY PARCEL NUMBER	12
HISTORIC PROPERTY	(H)






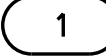


UTILITIES

	existing	PROPOSED
TELEPHONE POLE		 (plot point at face not center of symbol)
POWER POLE		
JOINT OCCUPANCY		
MISCELLANEOUS/UNKNOWN POLE		
GUY POLE OR PUSH BRACE		
LIGHT POLE		
LIGHT ON POWER POLE		
LIGHT ON JOINT POLE		
POLE STATUS: REMOVE, LEAVE, PROPOSED, OR TEMPORARY AS APPLICABLE e.g.:	 R L	 P+04 T+04 25.0' 25.0'
RAILROAD		
RAILROAD SIGN		
RAILROAD SIGNAL		
UTILITY JUNCTION BOX		
OVERHEAD WIRE		
UNDERGROUND UTILITIES		
WATER (on existing lines label size, type and note if abandoned)		
SEWER		
TELEPHONE		
ELECTRIC		
GAS		
LIGHTING		
INTELLIGENT TRANSPORTATION SYSTEM		
FIBER OPTIC		
WATER SHUT OFF		
GAS SHUT OFF		
HYDRANT		
MANHOLES		
SEWER		
TELEPHONE		
ELECTRICAL		
GAS		
UNKNOWN		

TRAFFIC SIGNALS / ITS

	existing	PROPOSED
MAST ARM (existing)		
OPTICOM RECEIVER		
OPTICOM STROBE		
TRAFFIC SIGNAL		
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT		
SIGNAL CONDUIT		
CONTROLLER CABINET		
METER PEDESTAL		
PULL BOX		
LOOP DETECTOR (QUADRUPOLE)		
LOOP DETECTOR (RECTANGULAR)		
CAMERA POLE (CCTV)		
FIBER OPTIC DELINEATOR		
FIBER OPTIC SPLICE VAULT		
ITS EQUIPMENT CABINET		
VARIABLE SPEED LIMIT SIGN		
DYNAMIC MESSAGE SIGN		
ROAD AND WEATHER INFO SYSTEM		

CONSTRUCTION NOTES

CURB MARK NUMBER - BITUMINOUS	B-1
CURB MARK NUMBER - GRANITE	G-1
CLEARING AND GRUBBING AREA	
DRAINAGE NOTE	
EROSION CONTROL NOTE	
FENCING NOTE	
GUARDRAIL NOTE	
ITS NOTE	
LIGHTING NOTE	
TRAFFIC SIGNAL NOTE	

SHEET 2 OF 2

STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
<i>STANDARD SYMBOLS</i>				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	41738s+dsymb1_2	41738	3	9

WETLAND IMPACT SUMMARY											
WETLAND NUMBER	WETLAND CLASS- IFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT				TEMPORARY		PERMANENT		
			N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	BANK RIGHT	CHANNEL
			SF	LF	SF	LF	SF	LF	LF	LF	LF
1	R3UB12	A			3966	333					
1	BANK	B	7629	412			875	145			
1	R3UB12	C					1719	356			
1	BANK	D	167	11							
1	BANK	E					266	20			
2	PEM1E	F			15	10					
2	PEM1E	G					6	4			
		TOTAL	7796	423	3981	343	2866	525			

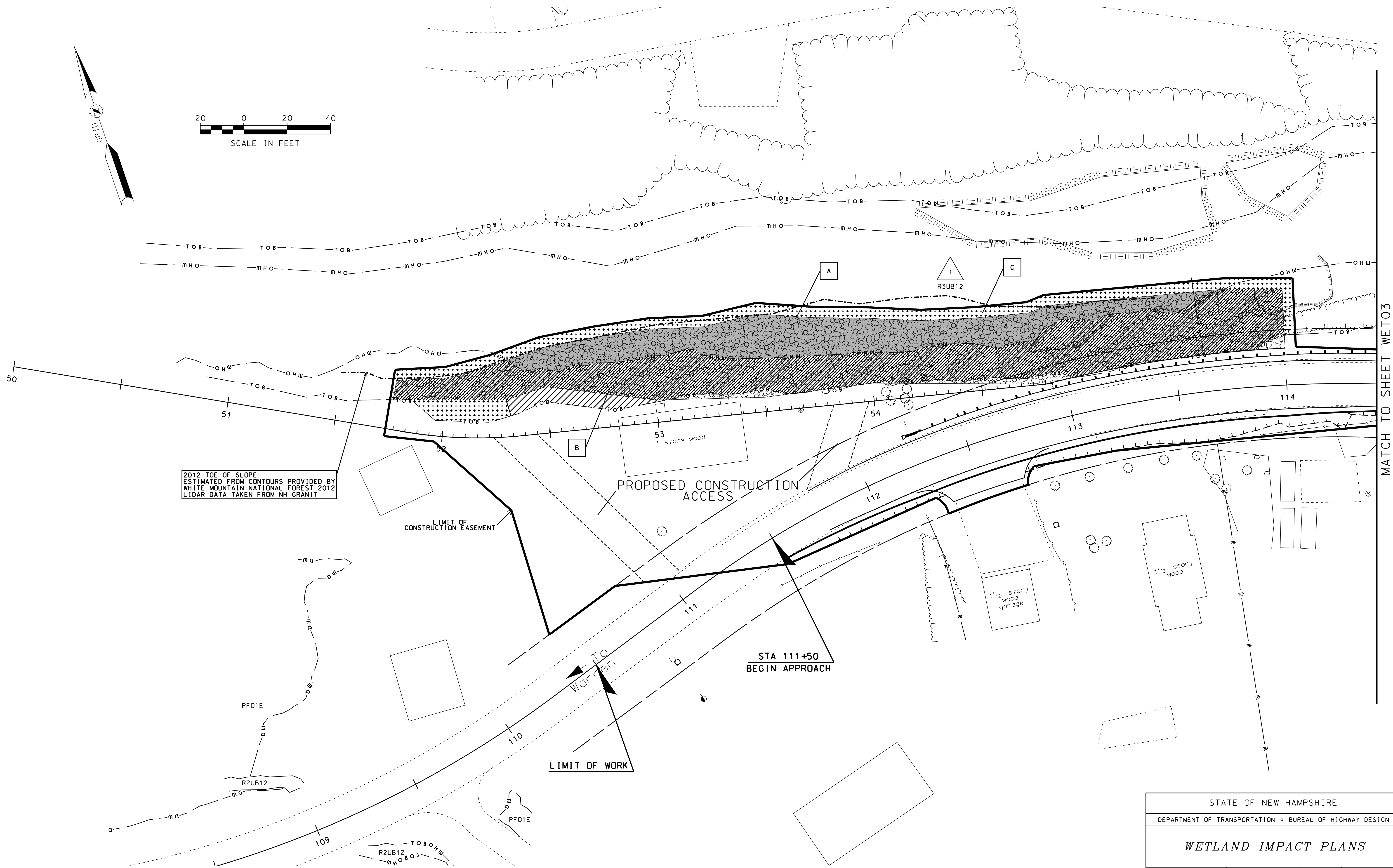
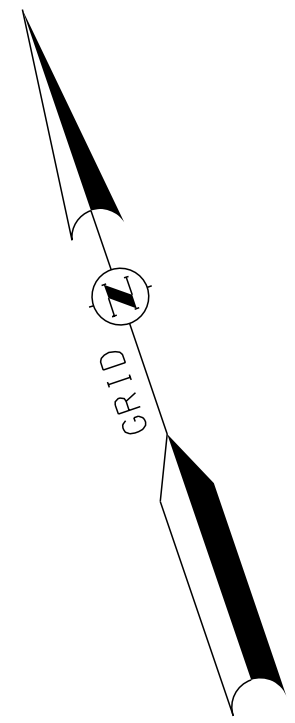
PERMANENT IMPACTS: 11777 SF
TEMPORARY IMPACTS: 2866 SF

TOTAL IMPACTS: 14643 SF

LEGEND	
TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	
	WETLAND DESIGNATION NUMBER
	WETLAND IMPACT LOCATION
	WETLAND MITIGATION AREA
	MITIGATION

WETLAND CLASSIFICATION CODES	
R3UB12	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, SAND
BANK	BANK
PEM1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
WETLAND IMPACT SUMMARY			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738wetplans	41738	4	9

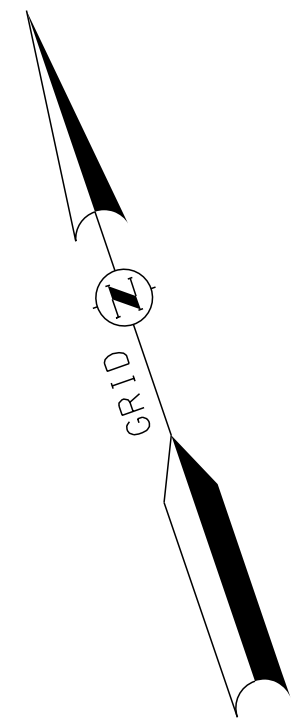
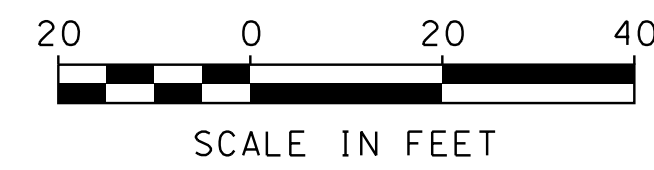
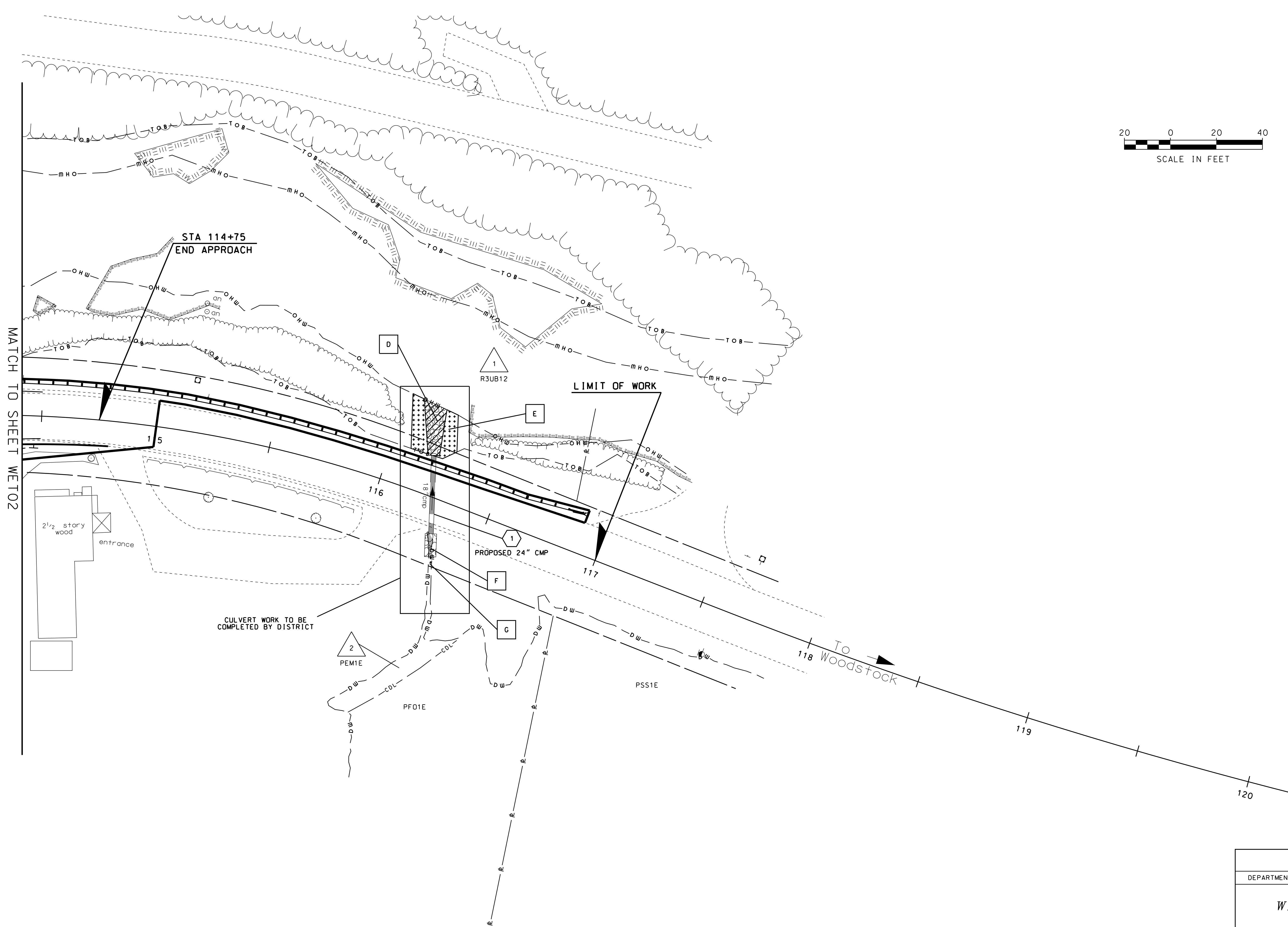


2012 TOE OF SLOPE
ESTIMATED FROM CONTOURS PROVIDED BY
WHITE MOUNTAIN NATIONAL FOREST 2012
LIDAR DATA TAKEN FROM NH GRANIT

PROPOSED CONSTRUCTION
ACCESS

STA 111+50
BEGIN APPROACH

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
WETLAND IMPACT PLANS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738wetplans	41738	5	9



STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
WETLAND IMPACT PLANS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738wetplans	41738	6	9

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:

1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).

1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.

1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).

1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WO 1500 REQUIREMENTS ([HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM](http://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM))

1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.
2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:

2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.

2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.

2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.

2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:

(A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;

(B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;

(C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;

(D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED

2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.

2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.

2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.

2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.

(A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.

(B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.

(C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.

(D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER STABILIZATION PLAN HAS BEEN APPROVED BY NHDOT.

(E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WO 1505.05) NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:

3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.

3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.

3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.

3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.

3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:

4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.

4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.

4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30", OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:

5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.

5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.

5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.

5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.

5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:

6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.

6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.

6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.

6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:

7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.

7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:

8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.

8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.

8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.

8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:

9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.

9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)

9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.

9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:

10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WO 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER.

TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.

10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.

10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:

11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.

11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.

11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.

11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.

11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.

11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.

11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.

11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.

11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:

12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.

12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.

12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.

12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.

12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.

12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.

12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.
13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:

13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.

13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.

13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRICES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.

13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.
14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:

14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WO 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.

14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.

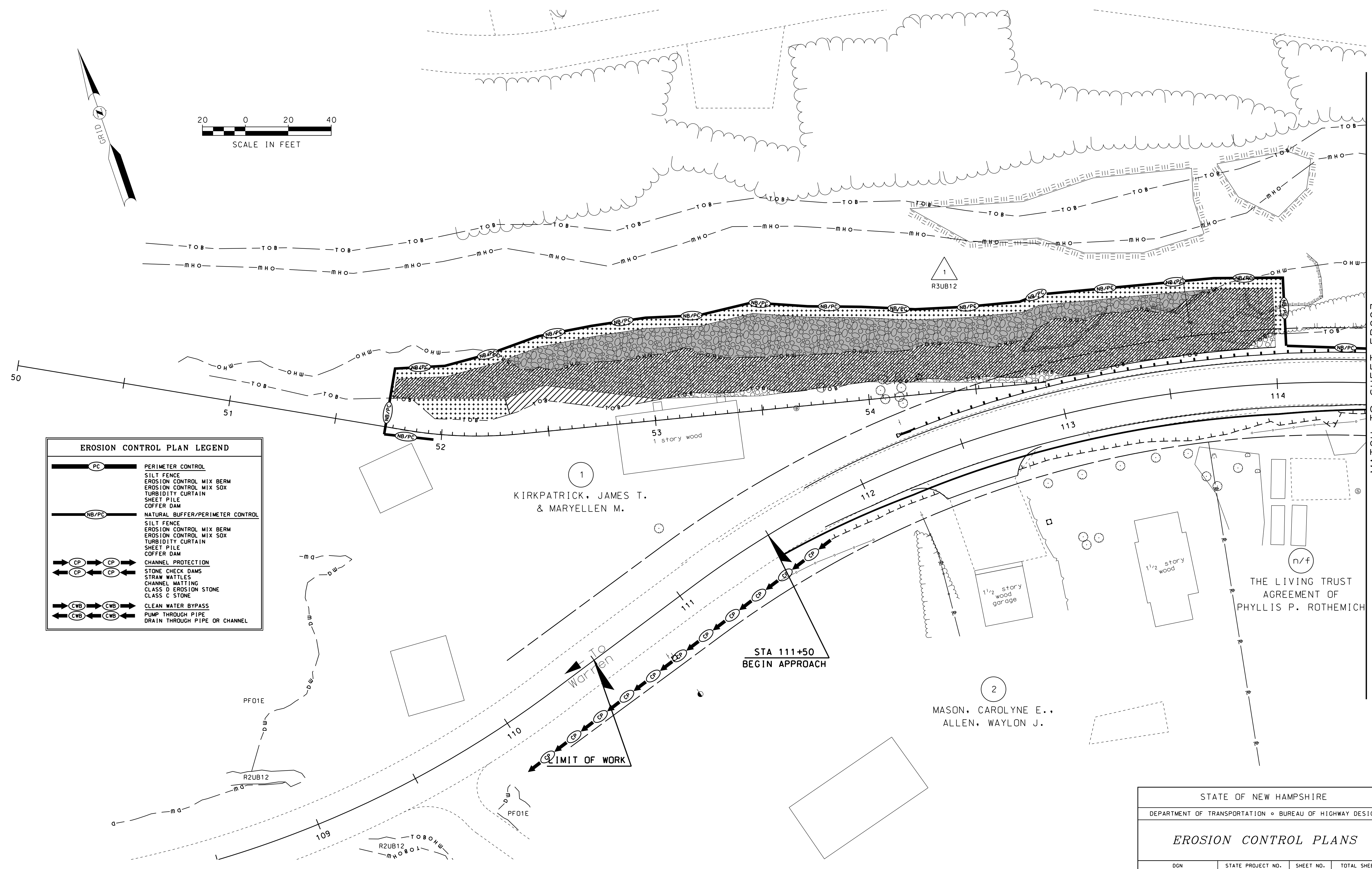
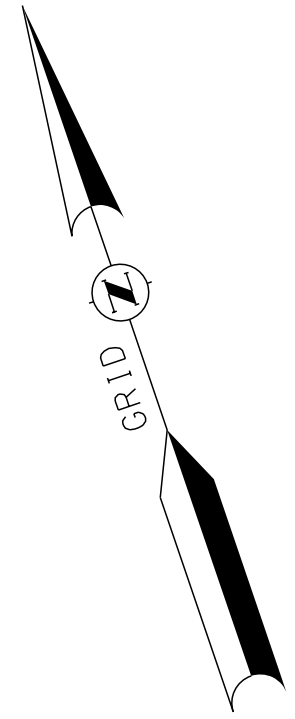
14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WO 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES ²				ROLLED EROSION CONTROL BLANKETS ³			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES ¹												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES ¹	YES ¹	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

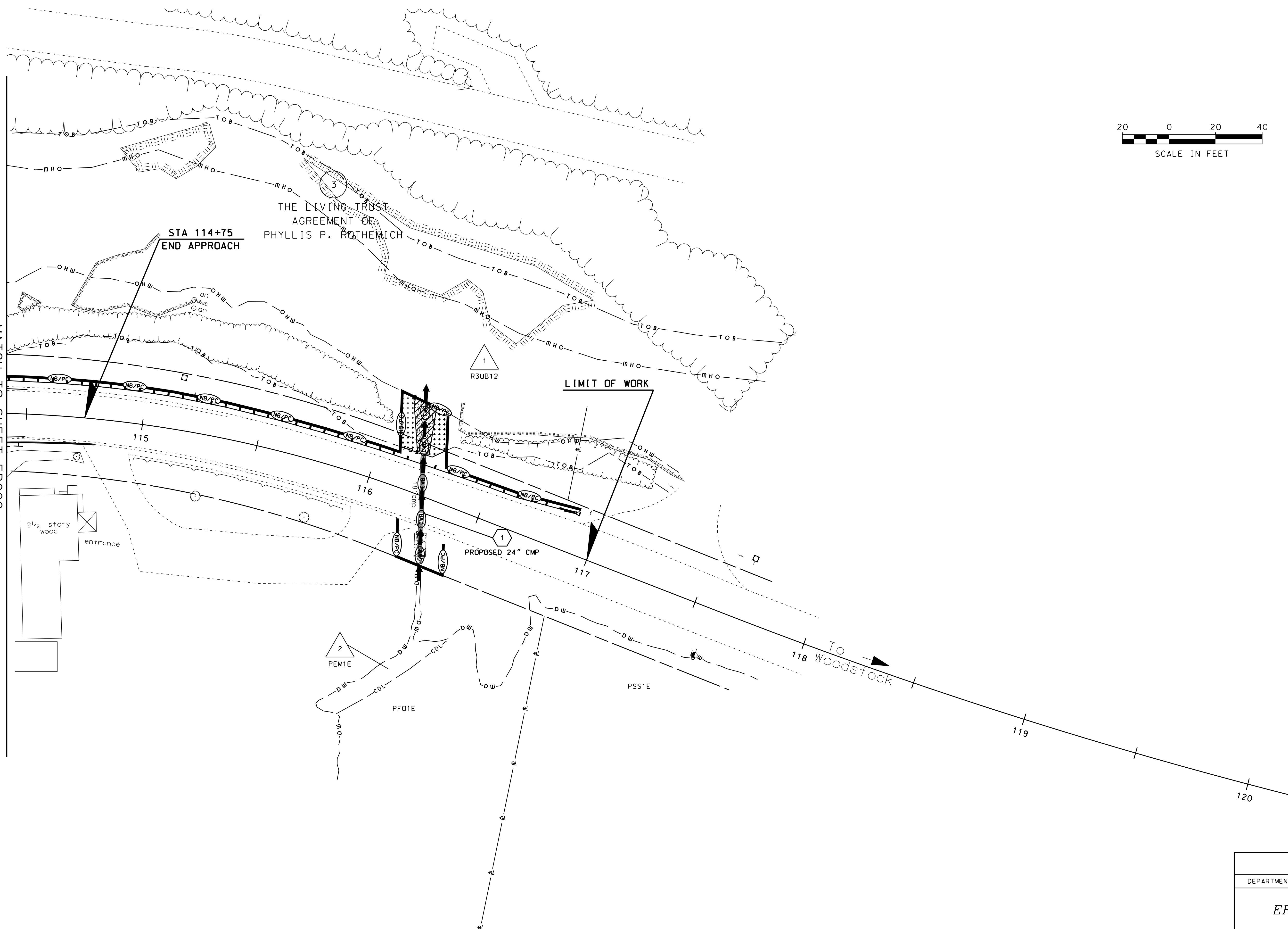
- NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.



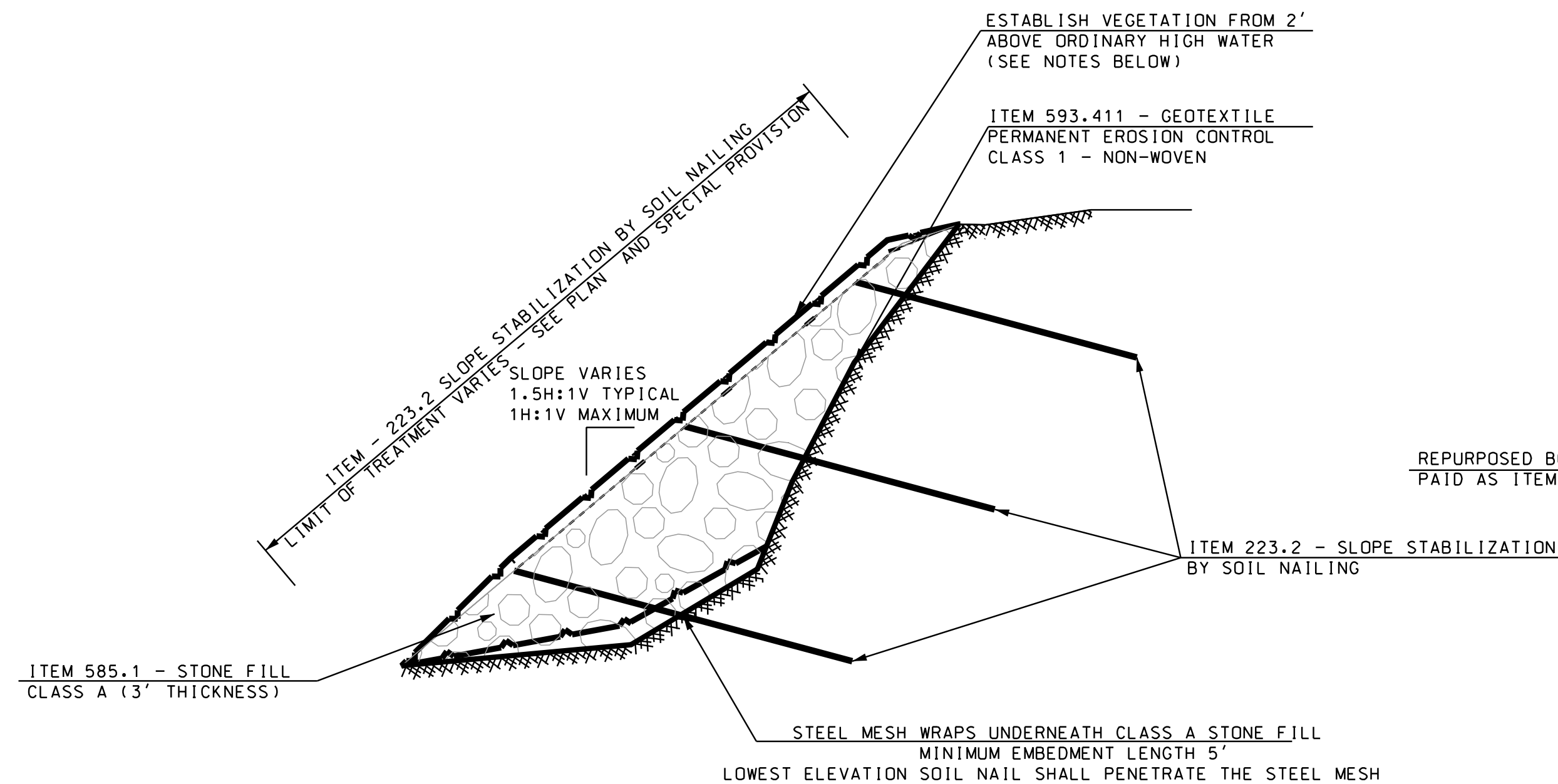
EROSION CONTROL PLAN LEGEND	
	PERIMETER CONTROL
	SILT FENCE
	EROSION CONTROL MIX BERM
	EROSION CONTROL MIX SOX
	TURBIDITY CURTAIN
	SHEET PILE
	COFFER DAM
	NATURAL BUFFER/PERIMETER CONTROL
	SILT FENCE
	EROSION CONTROL MIX BERM
	EROSION CONTROL MIX SOX
	TURBIDITY CURTAIN
	SHEET PILE
	COFFER DAM
	CHANNEL PROTECTION
	STONE CHECK DAMS
	STRAW WATTLES
	CHANNEL MATTING
	CLASS D EROSION STONE
	CLASS C STONE
	CLEAN WATER BYPASS
	PUMP THROUGH PIPE
	DRAIN THROUGH PIPE OR CHANNEL

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
EROSION CONTROL PLANS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738wetplans	41738	8	9

MATCH TO SHEET ERO02



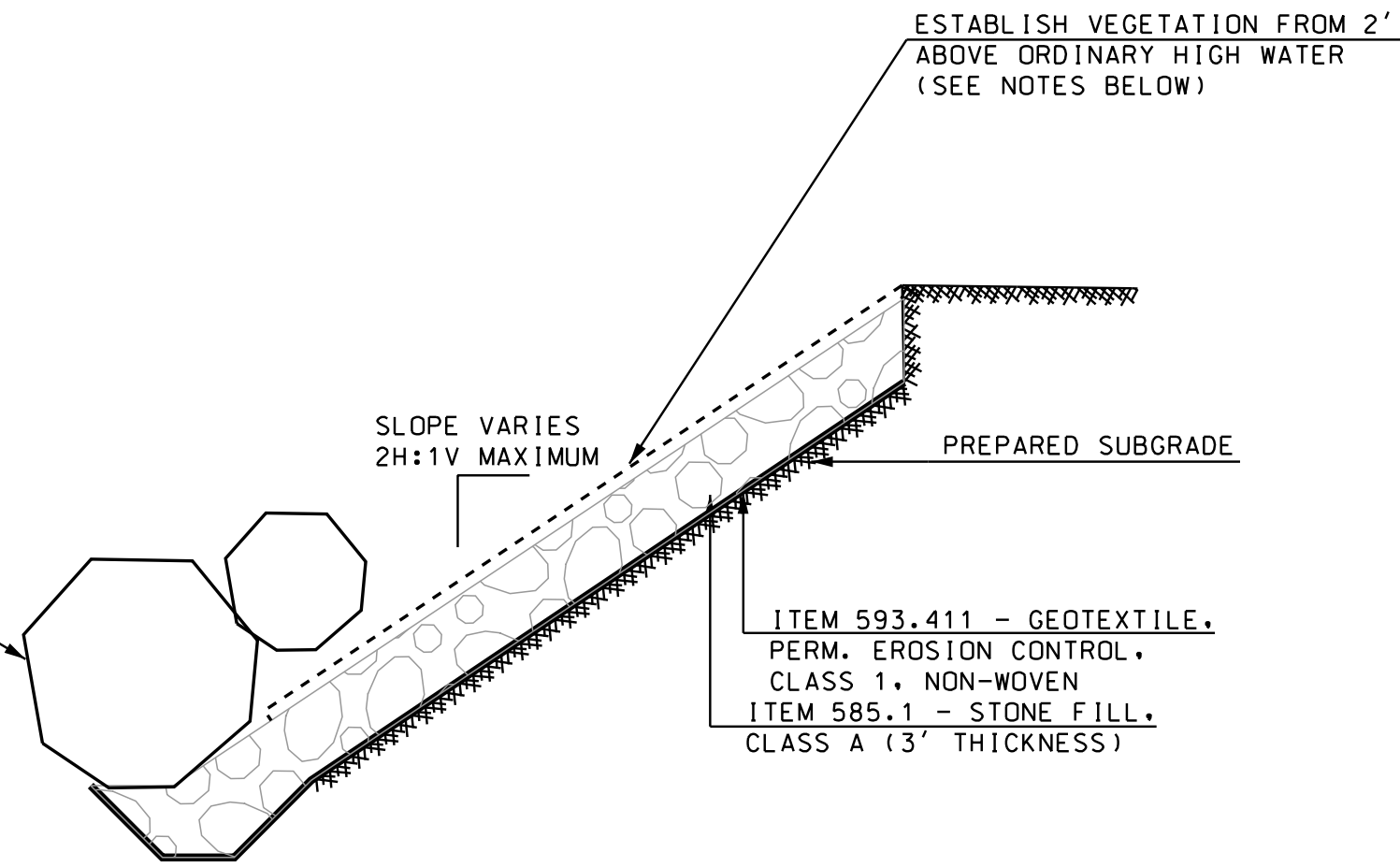
STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<i>EROSION CONTROL PLANS</i>			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738wetplans	41738	9	9



SOIL NAIL SLOPE
TREATMENT DETAIL
STA 52+75 TO STA 114+00

NOT TO SCALE

- NOTES
1. CONTRACTOR SHALL CONSTRUCT ALL PERMANENT WORK WITHIN THE SLOPE LINES SHOWN ON THE GENERAL PLANS. ALL TEMPORARY WORK SHALL BE CONTAINED WITHIN THE EROSION CONTROL BARRIERS SHOWN ON THE EROSION CONTROL PLANS.
 2. REMOVE TOPSOIL FOR ITS TOTAL DEPTH WITHIN THE LIMITS OF THE SLOPE LINES. UNLESS OTHERWISE DIRECTED, STOCKPILE TOPSOIL IN ACCORDANCE WITH SECTION 203 AND USE IT ON THIS PROJECT AS NEEDED UNDER SECTION 641 - LOAM AND/OR SECTION 647 - HUMUS.
 3. REMOVE THE LOOSE SLOUGHED MATERIAL WITHIN THE SLOPE FAILURE AREA TO BE PAID FOR AS ITEM 203.1 COMMON EXCAVATION, PRIOR TO INITIATING THE SOIL NAIL OPERATION.
 4. CONTRACTOR SHALL EXCAVATE AND CONSTRUCT A 2' BY 2' CLASS A STONE KEY AT THE PROPOSED TOE OF SLOPE (SUBSIDIARY TO ITEM 585.1). IN THE EVENT THAT BEDROCK IS ENCOUNTERED DURING EXCAVATION OF THE KEY, THE CONTRACTOR SHALL CEASE EXCAVATION AND INCLUDE EXCAVATED AREA WITHIN THE SLOPE STABILIZATION BY SOIL NAILING CONSTRUCTION.
 5. CONSTRUCT SLOPE STABILIZATION BY SOIL NAILING PER ITEM 223.3. DESIGN WILL LIKELY INCLUDE SOIL NAIL ANCHORING INTO SOIL AND/OR BEDROCK.
 6. CONTRACTOR SHALL PLACE A CLASS 1 NON-WOVEN GEOTEXTILE PERMANENT EROSION CONTROL FABRIC (ITEM 593.411) OVER THE EXPOSED SUBGRADE.
 7. PLACE A MINIMUM 3' THICK LAYER OF ITEM 585.1 CLASS A STONE FILL.
 8. FROM AN ELEVATION 2' ABOVE THE ORDINARY HIGH WATER (SEE PLANS) AND EXTENDING TO THE TOP OF THE DISTURBED SLOPE THE CONTRACTOR SHALL USE EXCAVATION TOOLS TO WORK ITEM 647.1 HUMUS INTO THE VOID SPACES OF THE UNDERLYING CLASS A STONE FILL TO PRODUCE A MINIMUM 3" AND MAXIMUM 4" THICK LIFT OF ITEM 647.1 HUMUS DIRECTLY ABOVE THE CLASS A STONE FILL.
 9. PLACE ITEM 645.44 - TEMPORARY SLOPE STABILIZATION TYPE B (WILDLIFE FRIENDLY) OVER ITEM 647.1 HUMUS.
 10. PLACE STEEL MESH PER ITEM 223.3 OVER EROSION CONTROL MATTING.
 11. APPLY ITEM 646.21 TURF ESTABLISHMENT WITHOUT MULCH AS SOON AS IS SEASONALLY APPROPRIATE.

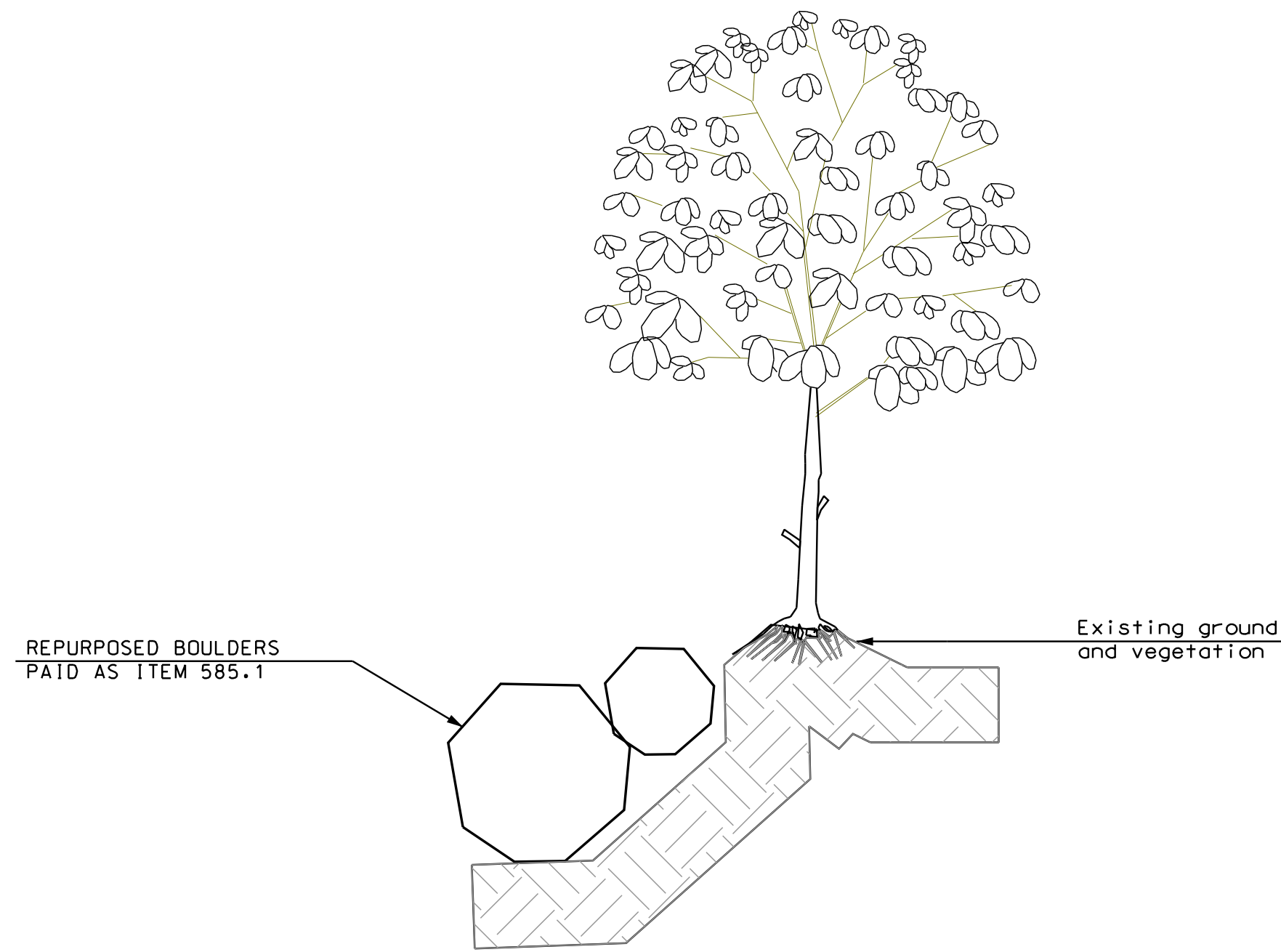


SLOPE STABILIZATION
DETAIL (FILL SLOPE)
STA 52+30 TO STA 52+75

NOT TO SCALE

- NOTES
1. CONTRACTOR SHALL CONSTRUCT ALL PERMANENT WORK WITHIN THE SLOPE LINES SHOWN ON THE GENERAL PLANS. ALL TEMPORARY WORK SHALL BE CONTAINED WITHIN THE EROSION CONTROL BARRIERS SHOWN ON THE EROSION CONTROL PLANS.
 2. REMOVE TOPSOIL FOR ITS TOTAL DEPTH WITHIN THE LIMITS OF THE SLOPE LINES. UNLESS OTHERWISE DIRECTED, STOCKPILE TOPSOIL IN ACCORDANCE WITH SECTION 203 AND USE IT ON THIS PROJECT AS NEEDED UNDER SECTION 641 - LOAM AND/OR SECTION 647 - HUMUS.
 3. REMOVE THE LOOSE SLOUGHED MATERIAL WITHIN THE SLOPE FAILURE AREA TO BE PAID FOR AS ITEM 203.1 COMMON EXCAVATION.
 4. CONTRACTOR SHALL EXCAVATE AND CONSTRUCT A 3' BY 3' CLASS A STONE KEY AT THE PROPOSED TOE OF SLOPE (SUBSIDIARY TO ITEM 585.1).
 5. CONTRACTOR SHALL PLACE A CLASS 1 NON-WOVEN GEOTEXTILE PERMANENT EROSION CONTROL FABRIC (ITEM 593.411) OVER THE EXPOSED SUBGRADE.
 6. PLACE A MINIMUM 3' THICK LAYER OF ITEM 585.1 CLASS A STONE FILL.
 7. FROM AN ELEVATION 2' ABOVE THE ORDINARY HIGH WATER (SEE PLANS) AND EXTENDING TO THE TOP OF THE DISTURBED SLOPE THE CONTRACTOR SHALL USE EXCAVATION TOOLS TO WORK ITEM 647.1 HUMUS INTO THE VOID SPACES OF THE UNDERLYING CLASS A STONE FILL TO PRODUCE A MINIMUM 3" AND MAXIMUM 4" THICK LIFT OF ITEM 647.1 HUMUS DIRECTLY ABOVE THE CLASS A STONE FILL.
 8. PLACE ITEM 645.44 - TEMPORARY SLOPE STABILIZATION TYPE B (WILDLIFE FRIENDLY) OVER ITEM 647.1 HUMUS.
 9. APPLY ITEM 646.21 TURF ESTABLISHMENT WITHOUT MULCH AS SOON AS IS SEASONALLY APPROPRIATE.
 10. CONTRACTOR SHALL PLACE EXISTING BOULDERS OTHERWISE DISTURBED DURING CONSTRUCTION AT THE TOE OF THE CONSTRUCTED SLOPE. THIS SHALL BE PAID AS ITEM 585.1.

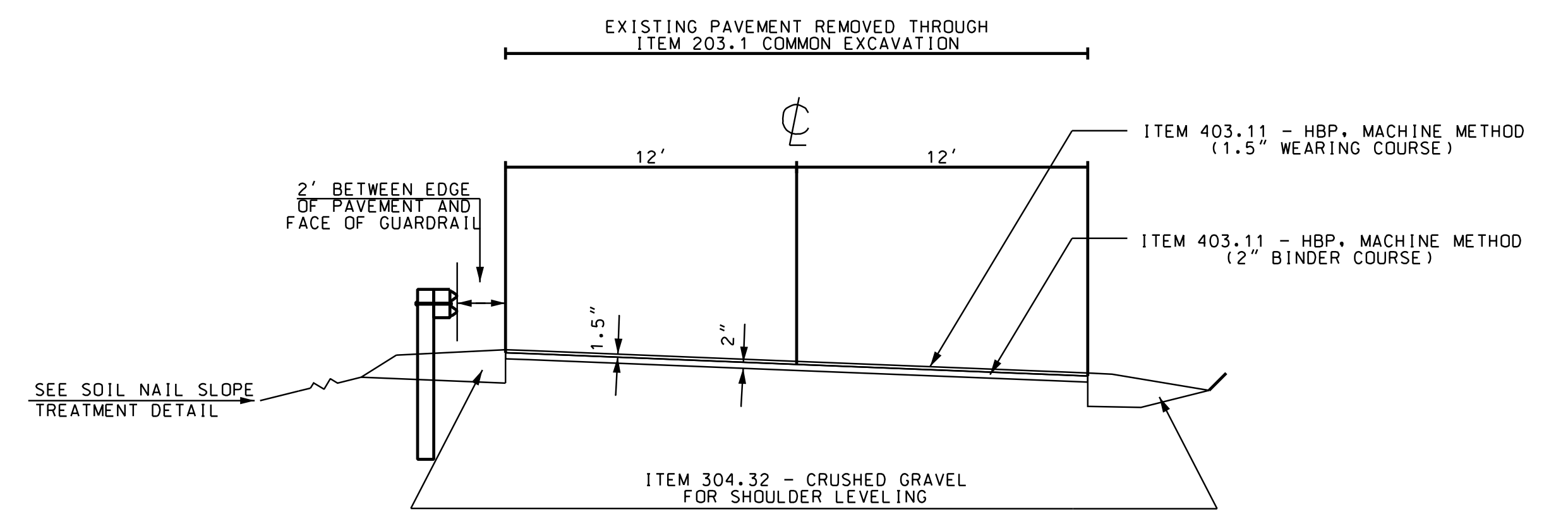
STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
TYPICAL DETAILS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738TYP	41738	1	2



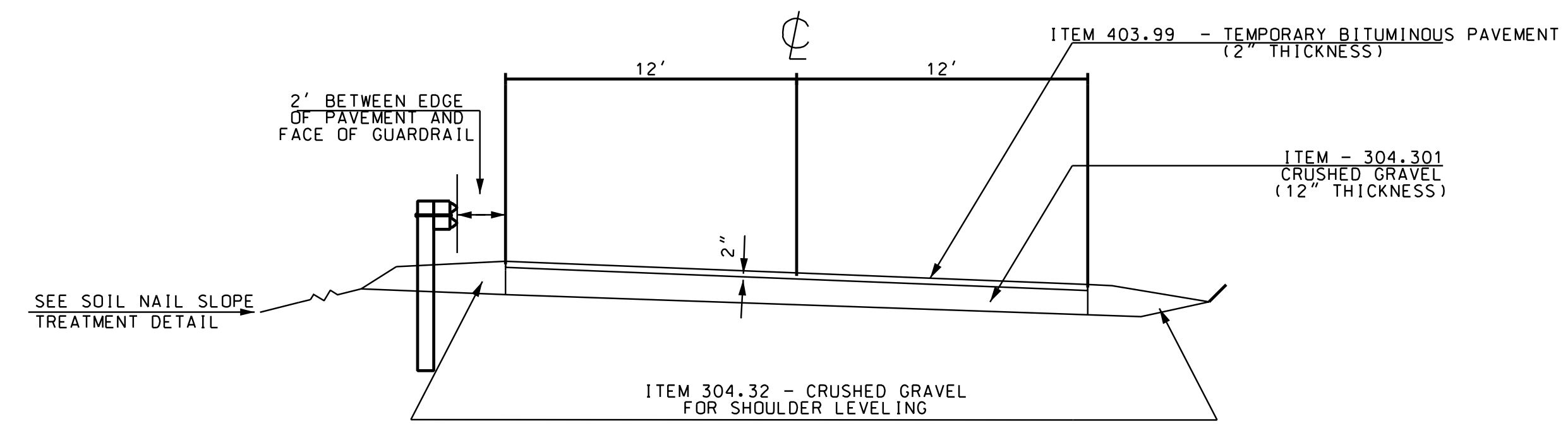
SLOPE STABILIZATION
DETAIL (FILL SLOPE)
STA 51+25 TO STA 52+30

NOT TO SCALE

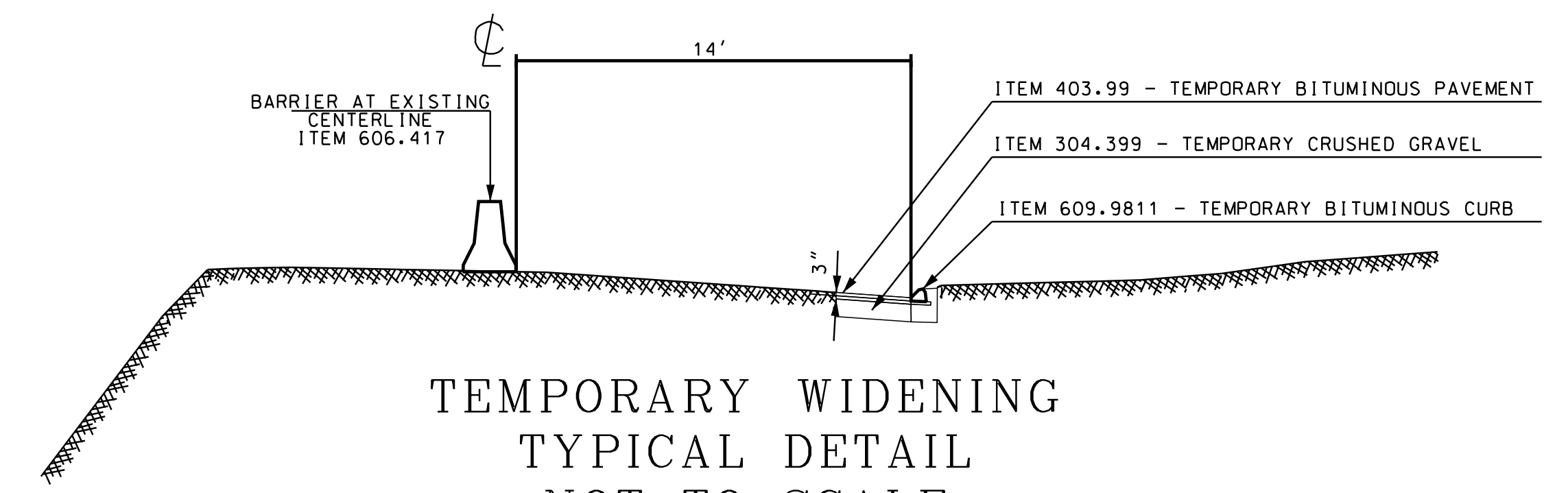
- NOTES
- 1. CONTRACTOR SHALL CONSTRUCT ALL PERMANENT WORK WITHIN THE SLOPE LINES SHOWN ON THE GENERAL PLANS. ALL TEMPORARY WORK SHALL BE CONTAINED WITHIN THE EROSION CONTROL BARRIERS SHOWN ON THE EROSION CONTROL PLANS.
 - 2. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING GROUND AND VEGETATION.
 - 3. CONTRACTOR SHALL PLACE EXISTING BOULDERS OTHERWISE DISTURBED DURING CONSTRUCTION ALONG THE EXISTING SLOPE. THIS SHALL BE PAID AS ITEM 585.1.



ROADWAY FINAL CONDITION
TYPICAL DETAIL
NOT TO SCALE

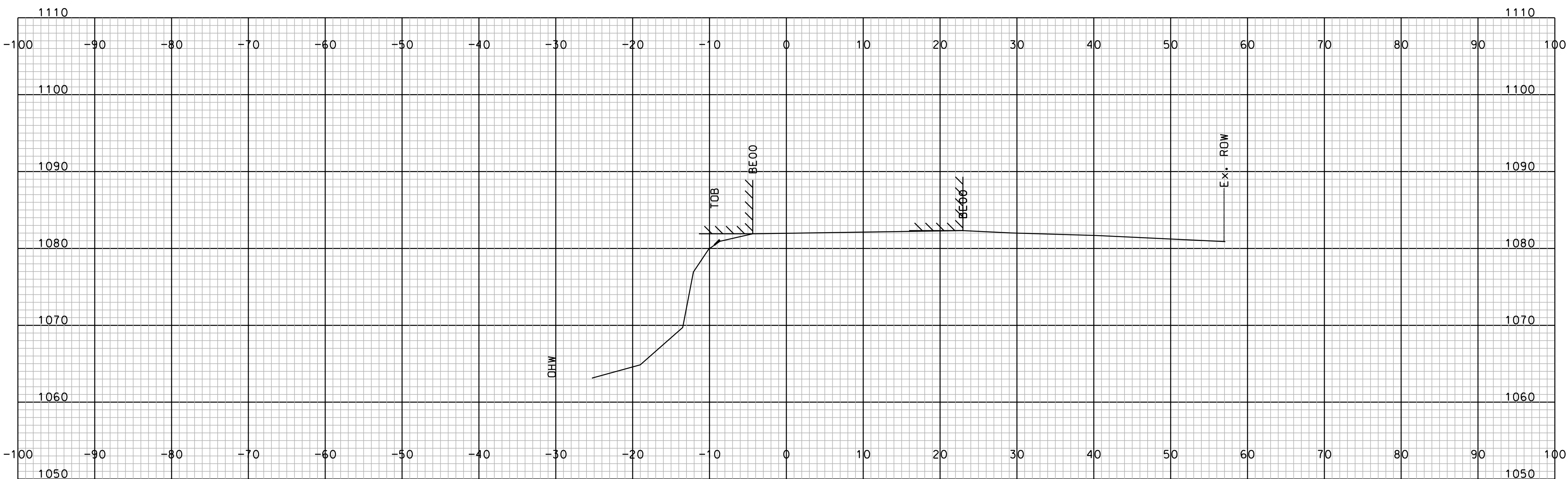


ROADWAY INTERMEDIATE CONDITION
TYPICAL DETAIL
NOT TO SCALE

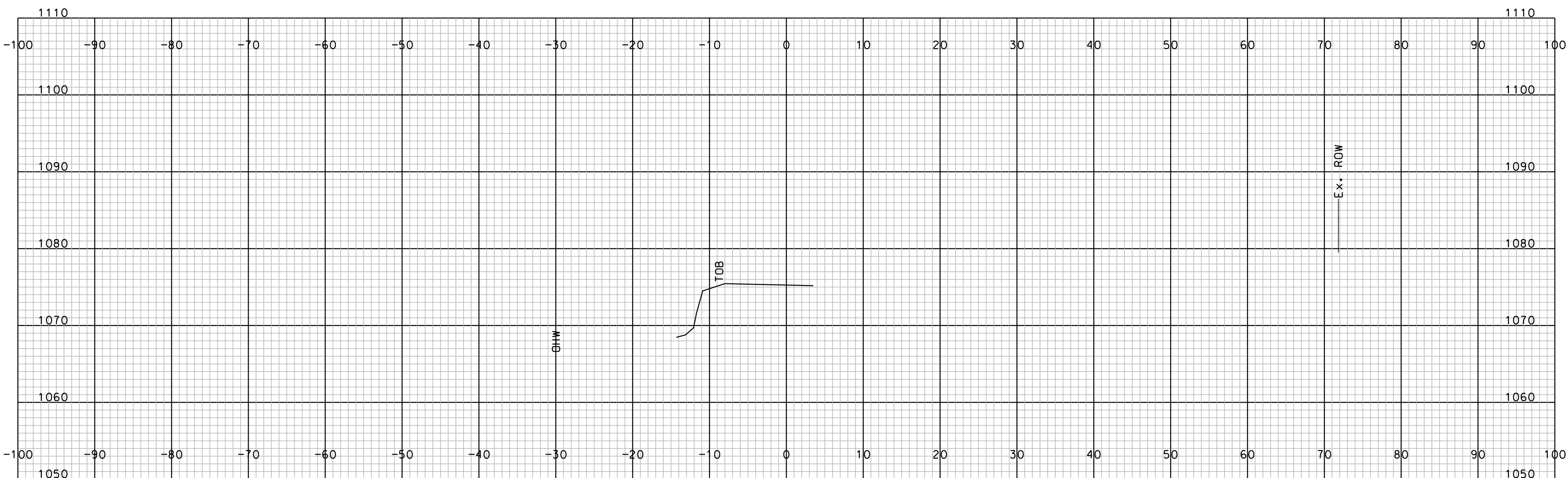


TEMPORARY WIDENING
TYPICAL DETAIL
NOT TO SCALE

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
TYPICAL DETAILS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738TYP	41738	2	2

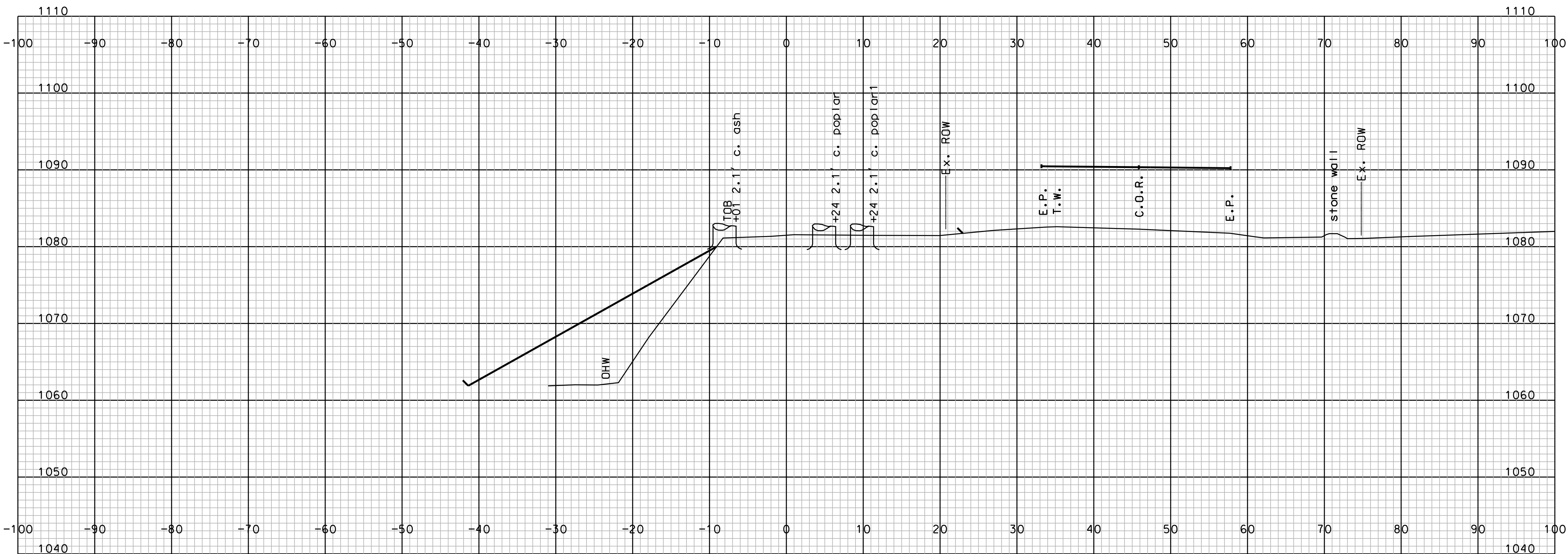


STA. 53+00.00

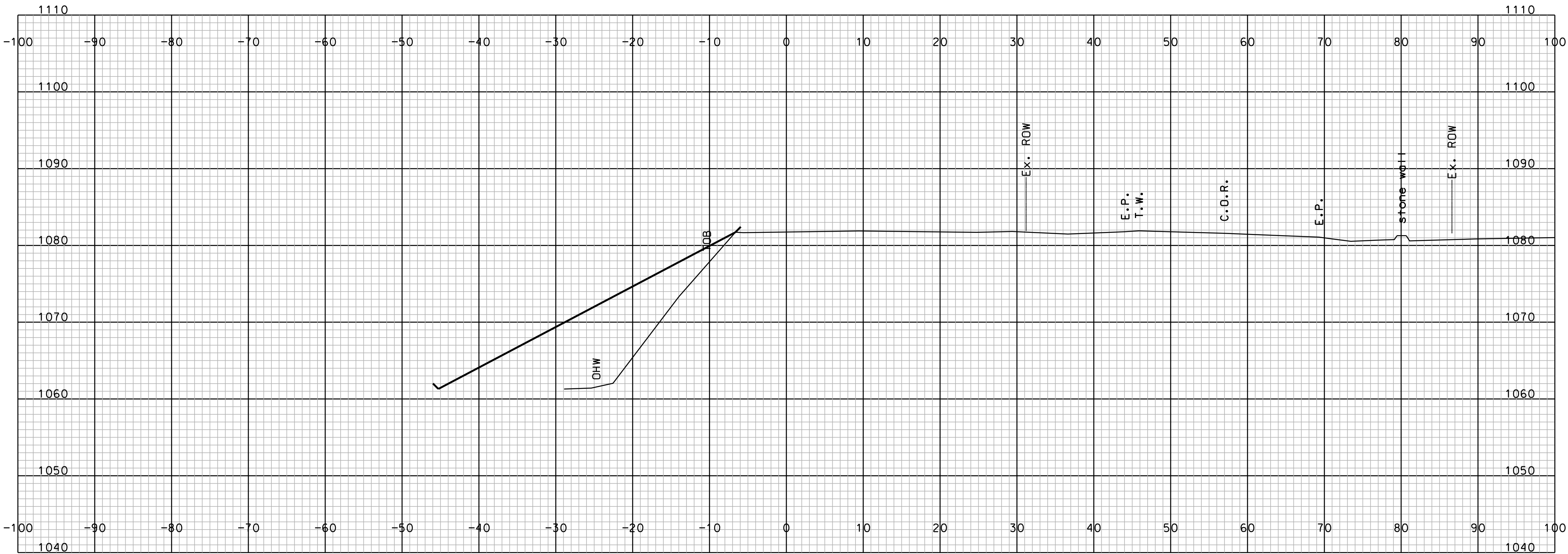


STA. 52+75.00

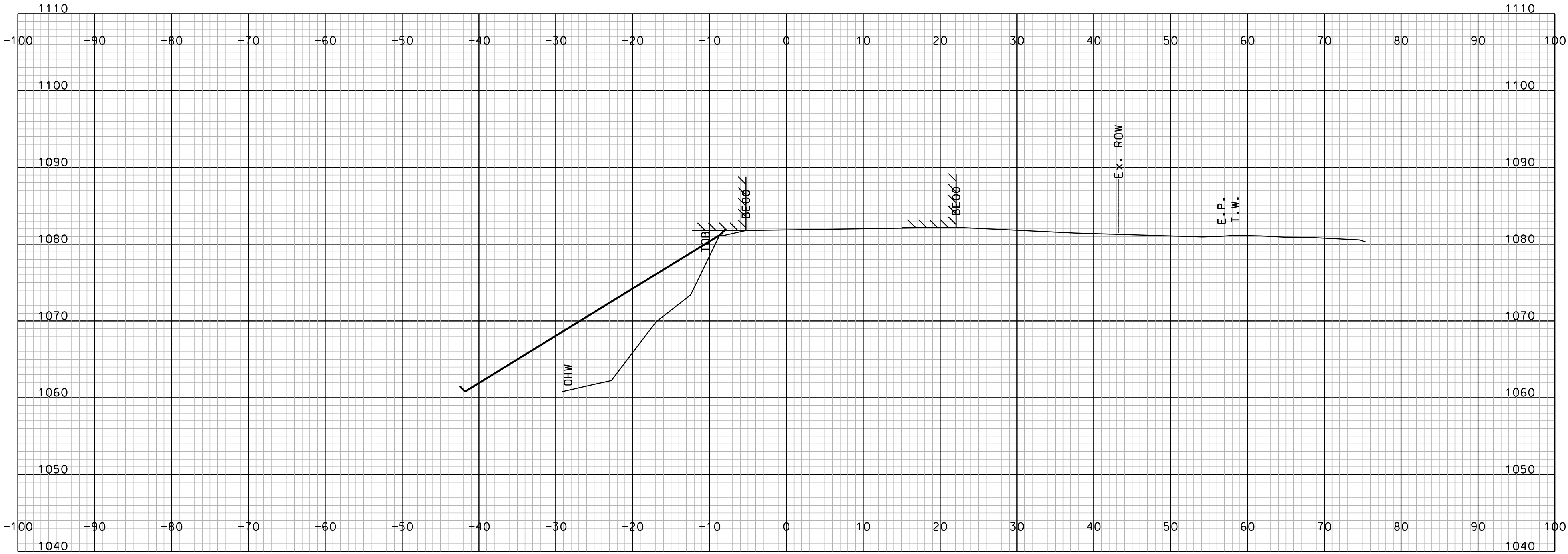
SHEET TOTALS			
COMMON EXCAV. _____ C.Y.	ROCK EXCAV. _____ C.Y.		
FILL _____ C.Y.	MUCK EXCAV. _____ C.Y.		
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 SLOPE XS	41738	1	11



STA. 53+75.00

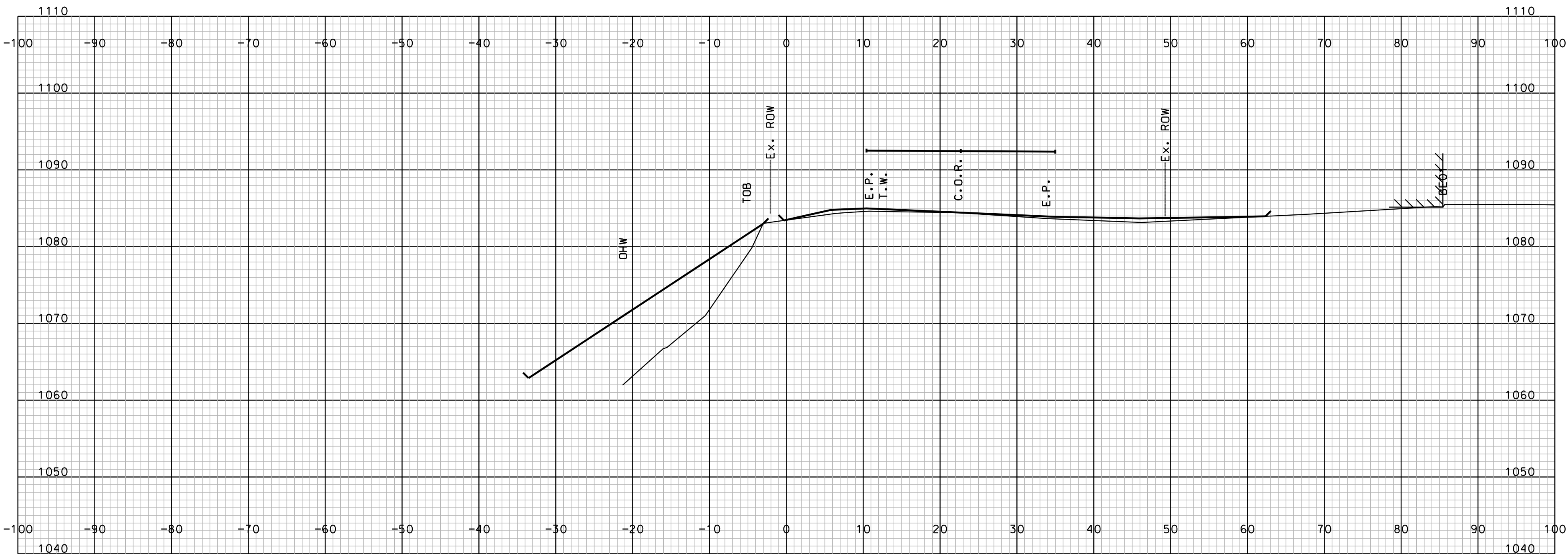


STA. 53+50.00

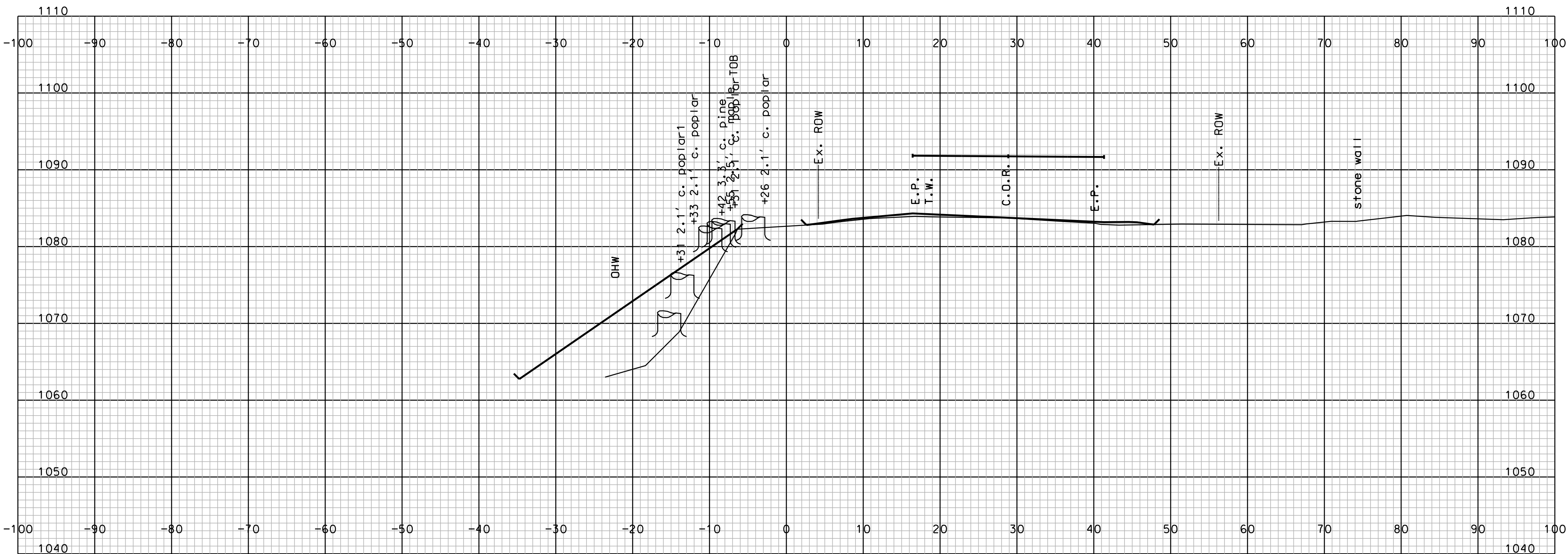


STA. 53+25.00

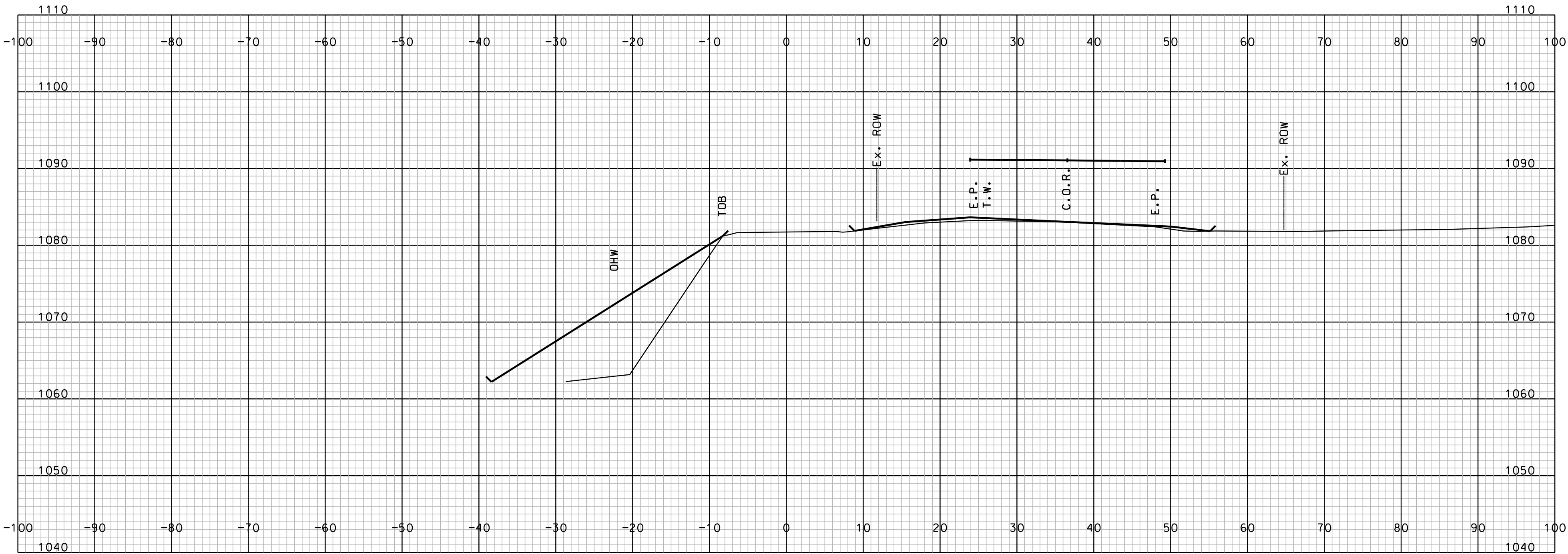
SHEET TOTALS					
COMMON EXCAV.	-	C.Y.	ROCK EXCAV.	-	C.Y.
FILL	-	C.Y.	MUCK EXCAV.	-	C.Y.
DGN		STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS	
41738 SLOPE XS		41738	2	11	



STA. 54+50.00

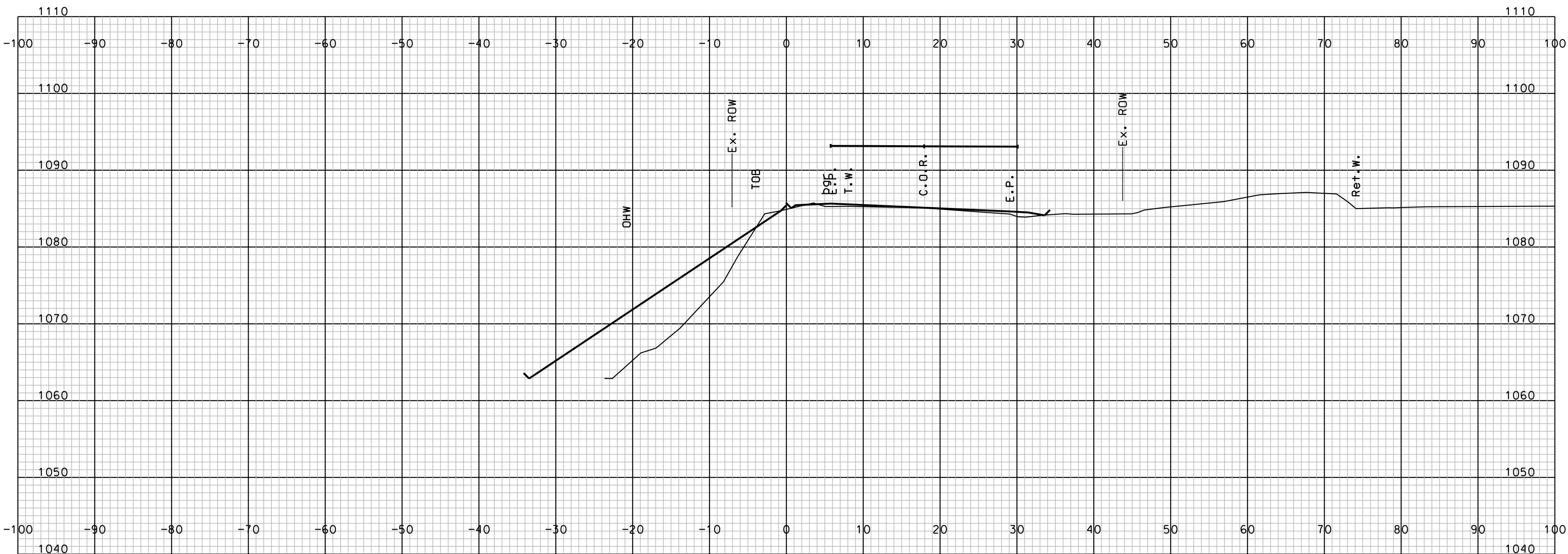


STA. 54+25.00



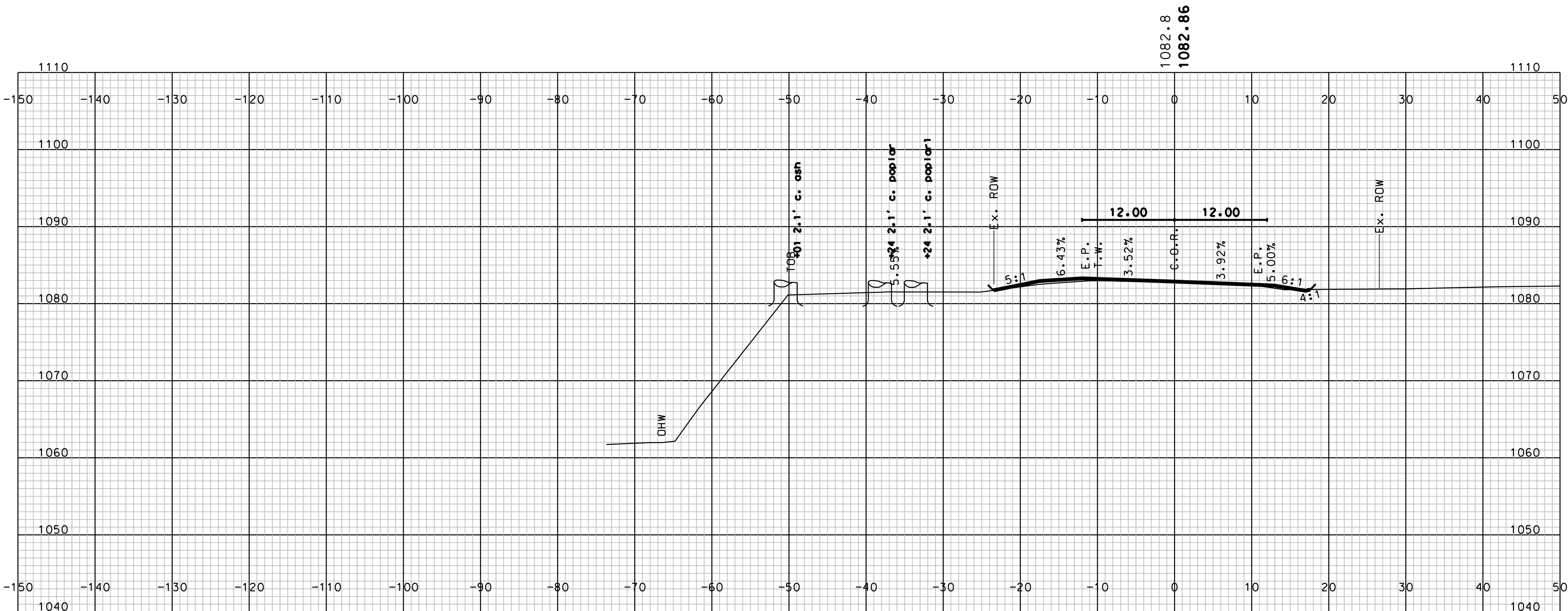
STA. 54+00.00

SHEET TOTALS					
COMMON EXCAV.	-	C.Y.	ROCK EXCAV.	-	C.Y.
FILL	-	C.Y.	MUCK EXCAV.	-	C.Y.
DGN	STATE PROJECT NO.		SHEET NO.	TOTAL SHEETS	
41738 SLOPE XS	41738		3	11	

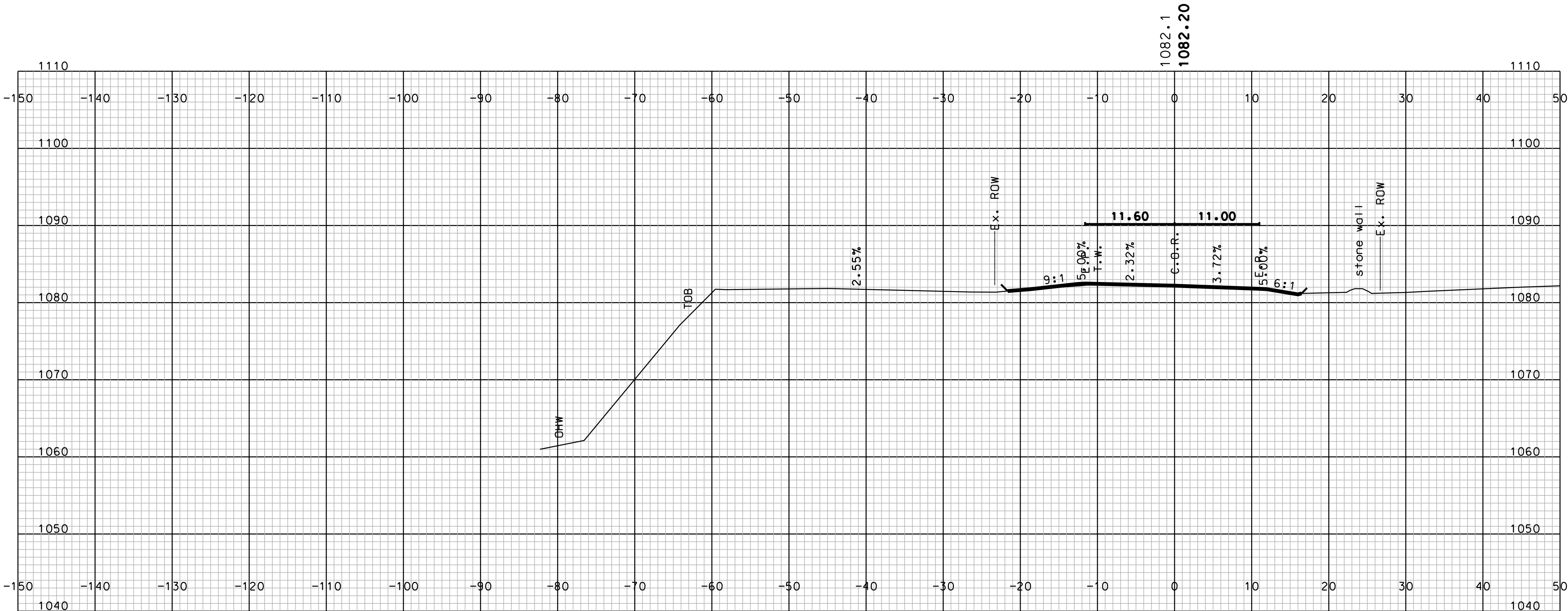


STA. 54+75.00

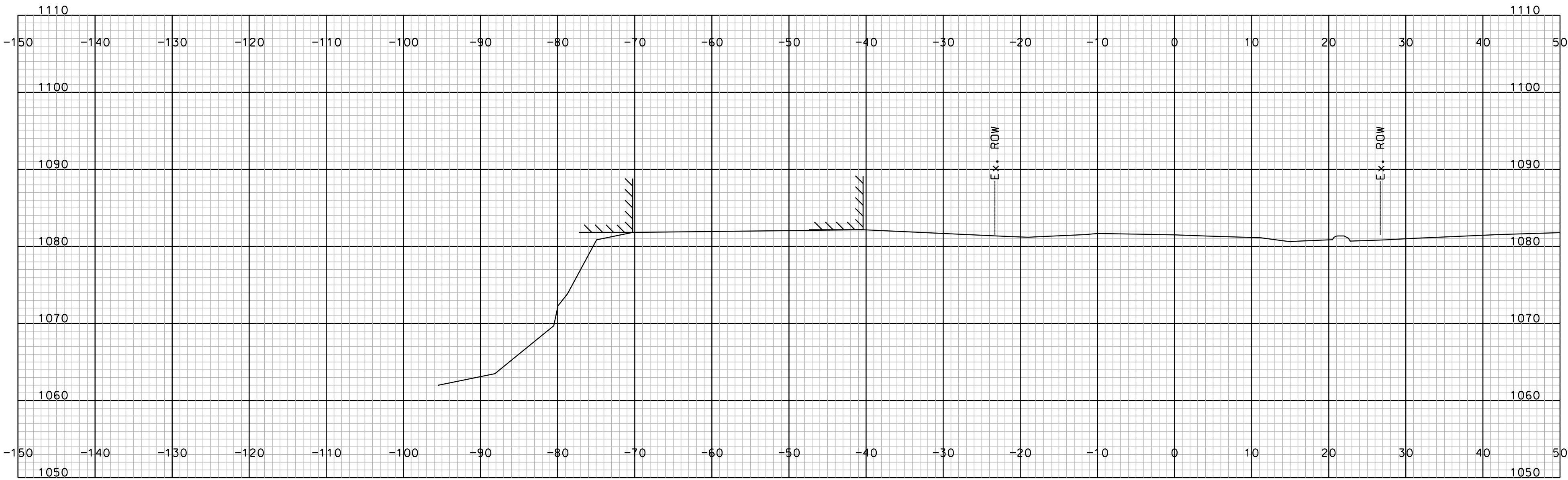
SHEET TOTALS			
COMMON EXCAV. _____ C.Y.	ROCK EXCAV. _____ C.Y.		
FILL _____ C.Y.	MUCK EXCAV. _____ C.Y.		
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 SLOPE XS	41738	4	11



STA. 112+00.00

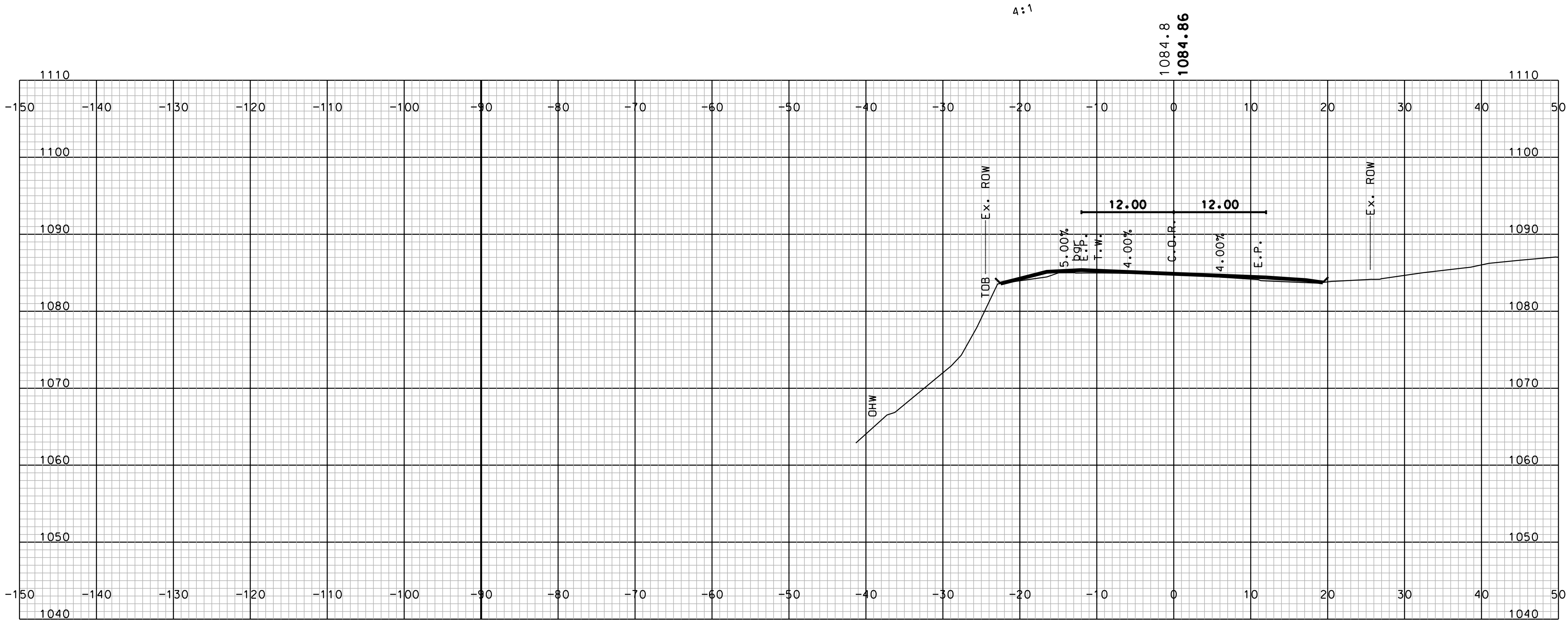


STA. 111+75.00

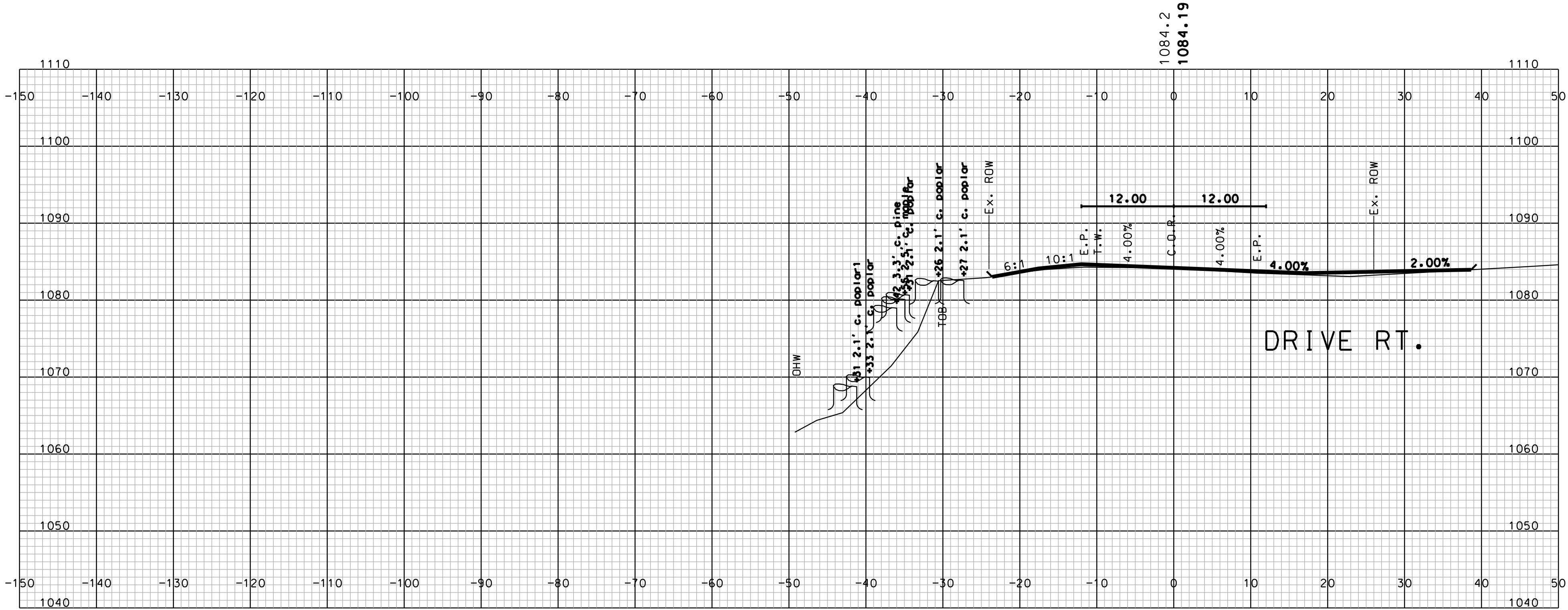


STA. 111+50.00

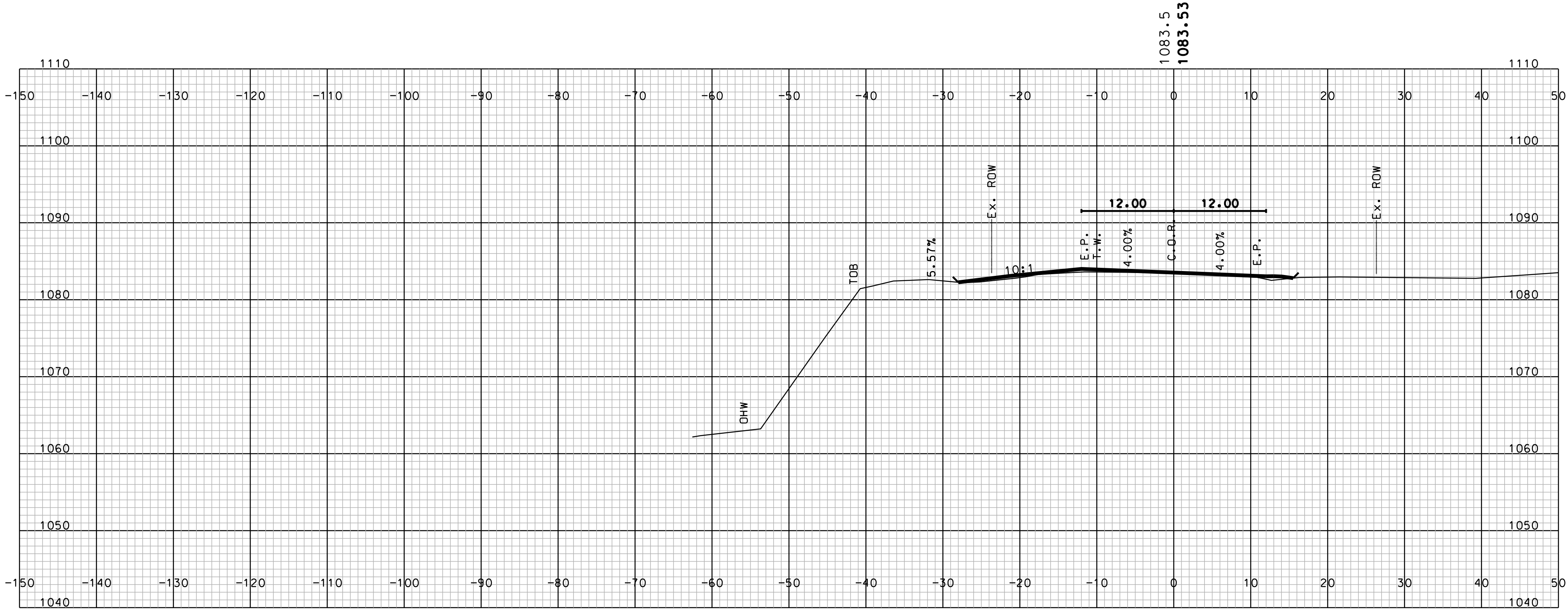
SHEET TOTALS			
COMMON EXCAV.	—	ROCK EXCAV.	—
	C.Y.		C.Y.
FILL	—	MUCK EXCAV.	—
	C.Y.		C.Y.
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 ROAD XS	41738	5	11



STA. 112+75.00

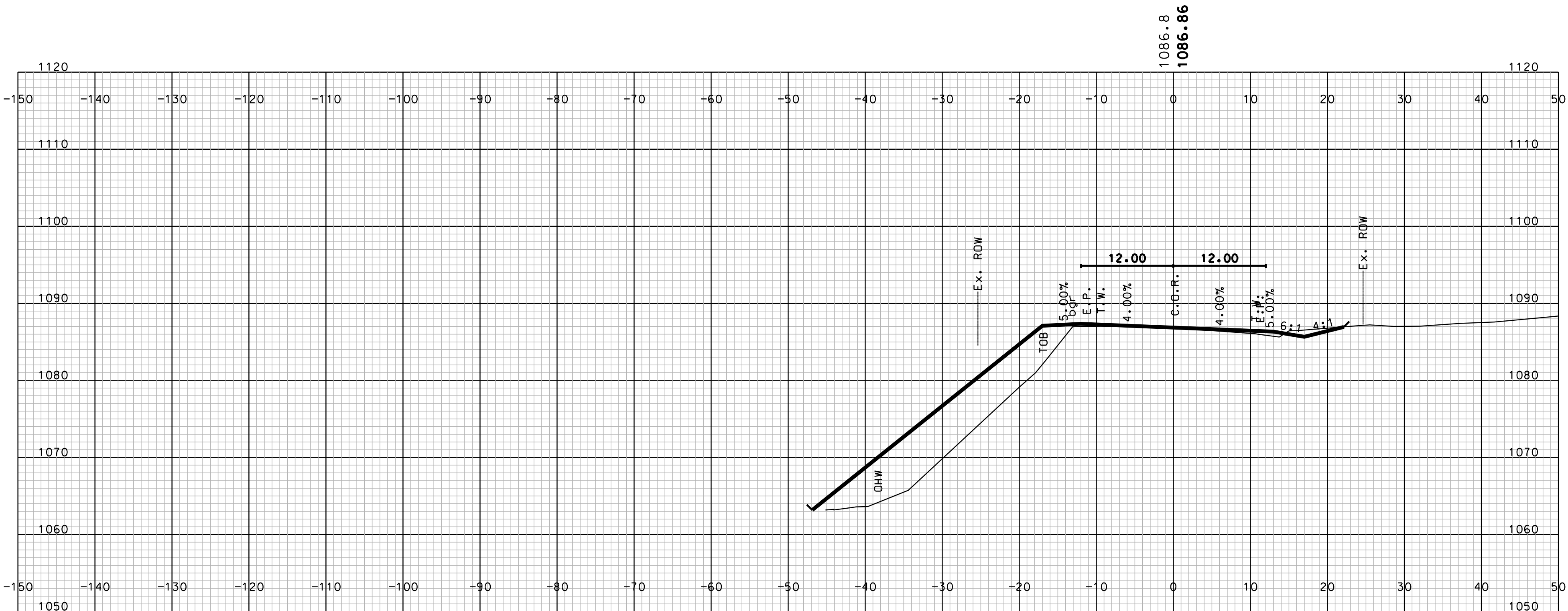


STA. 112+50.00

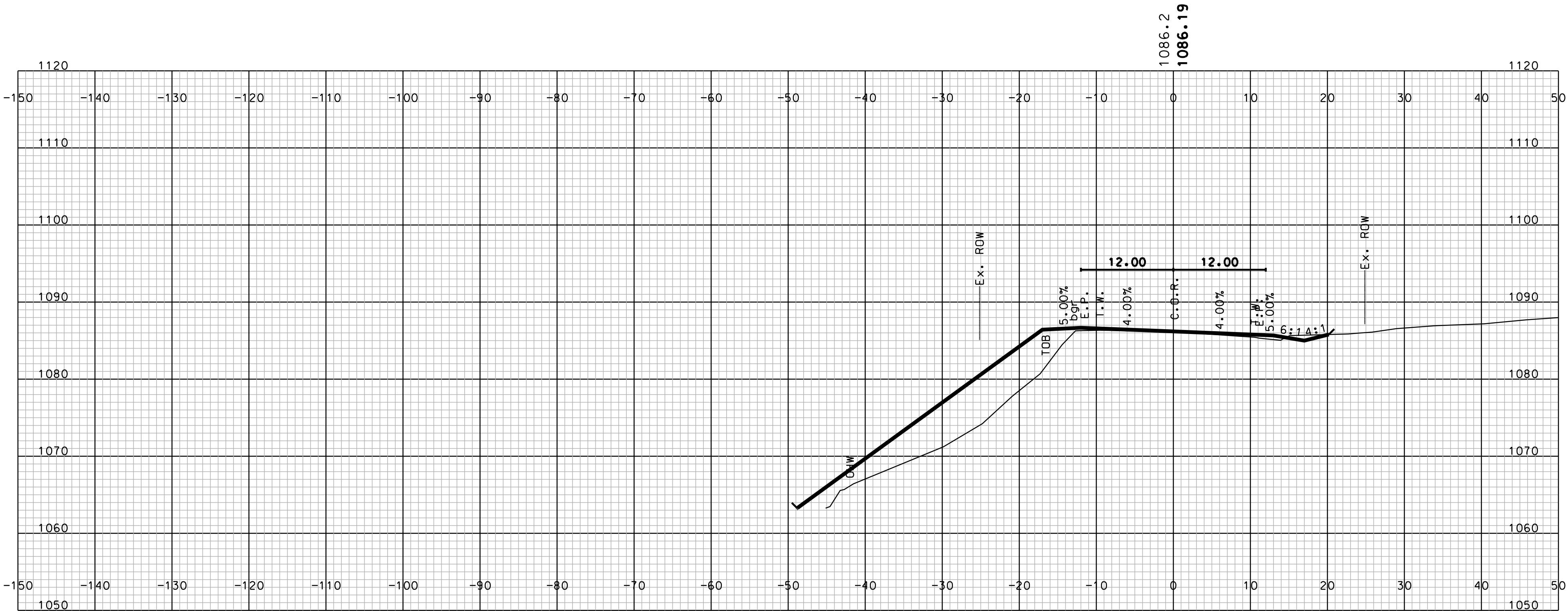


STA. 112+25.00

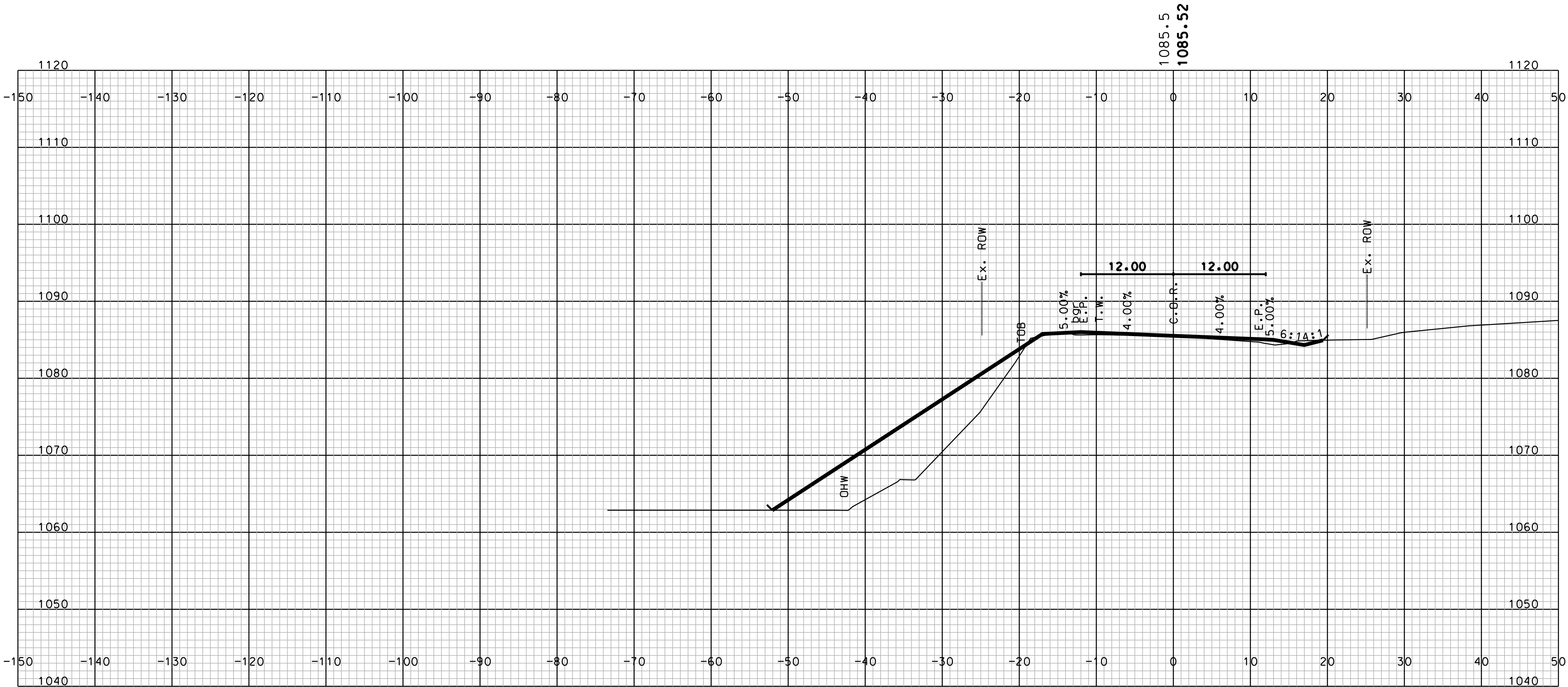
SHEET TOTALS					
COMMON EXCAV.	—	C.Y.	ROCK EXCAV.	—	C.Y.
FILL	—	C.Y.	MUCK EXCAV.	—	C.Y.
DGN	STATE PROJECT NO.		SHEET NO.	TOTAL SHEETS	
41738 ROAD XS	41738		6	11	



STA. 113+50.00

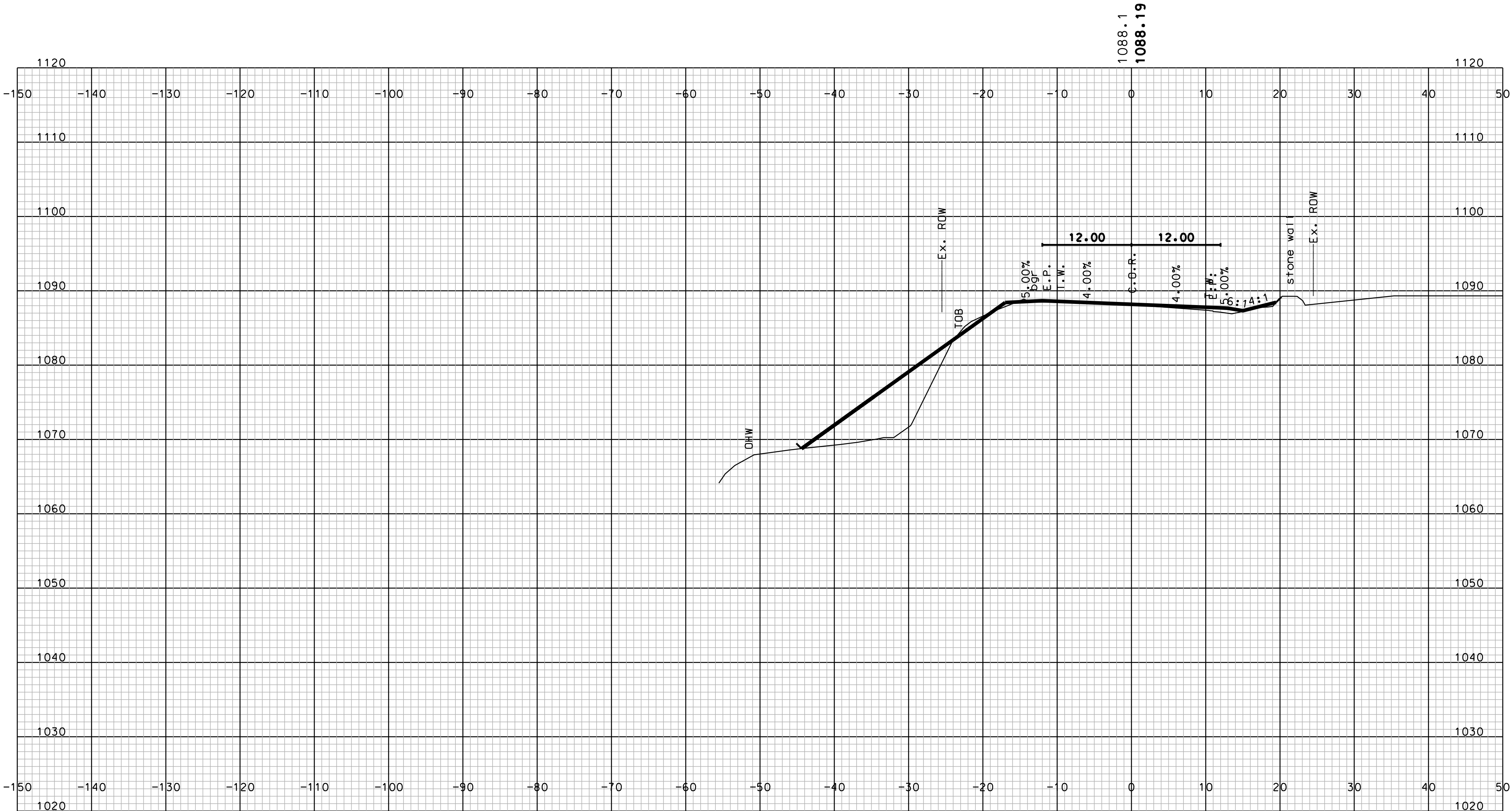


STA. 113+25.00

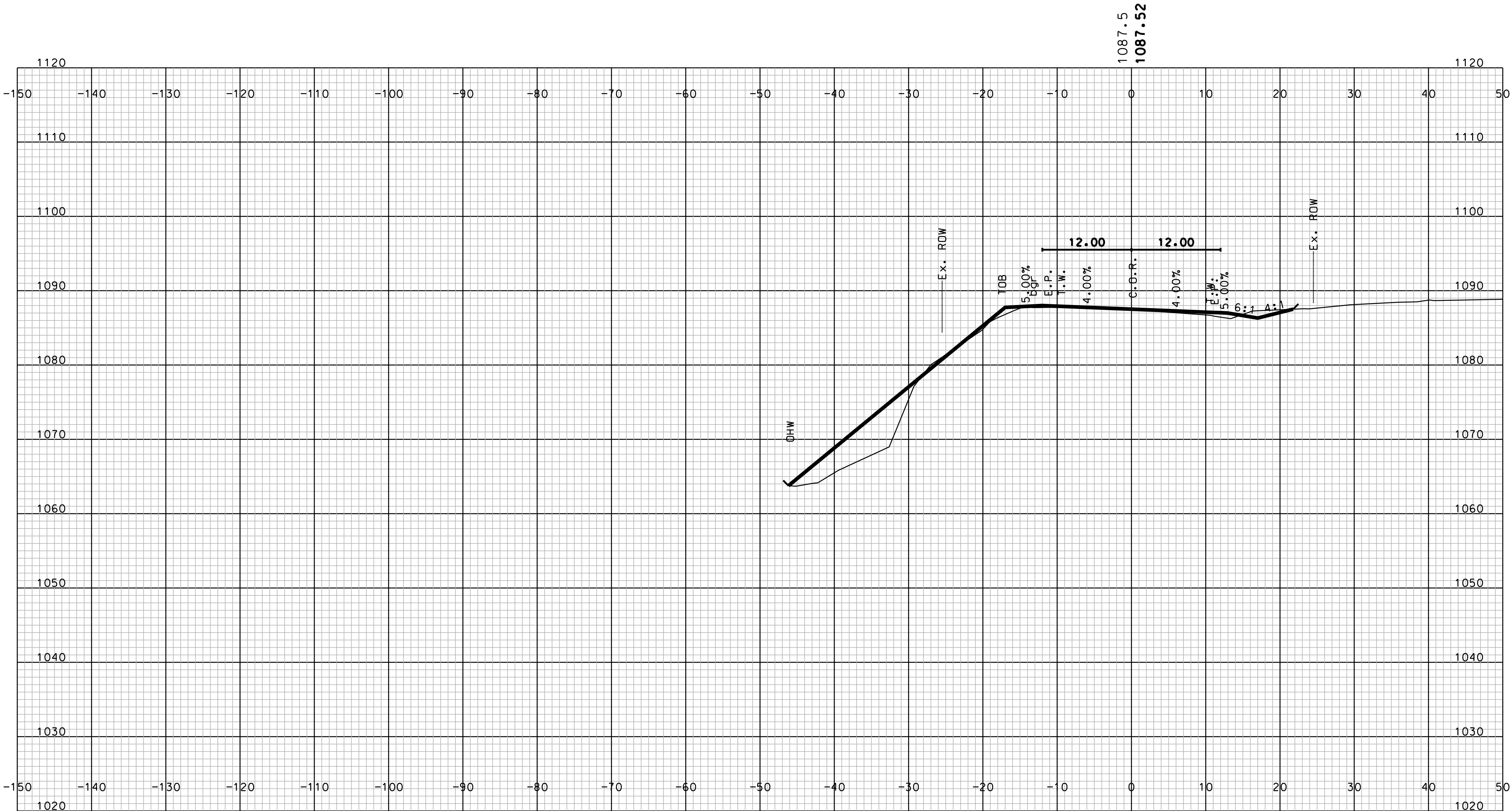


STA. 113+00.00

SHEET TOTALS					
COMMON EXCAV.	-	C.Y.	ROCK EXCAV.	-	C.Y.
FILL	-	C.Y.	MUCK EXCAV.	-	C.Y.
DGN		STATE PROJECT NO.		SHEET NO.	TOTAL SHEETS
41738 ROAD XS		41738		7	11



STA. 114+00.00

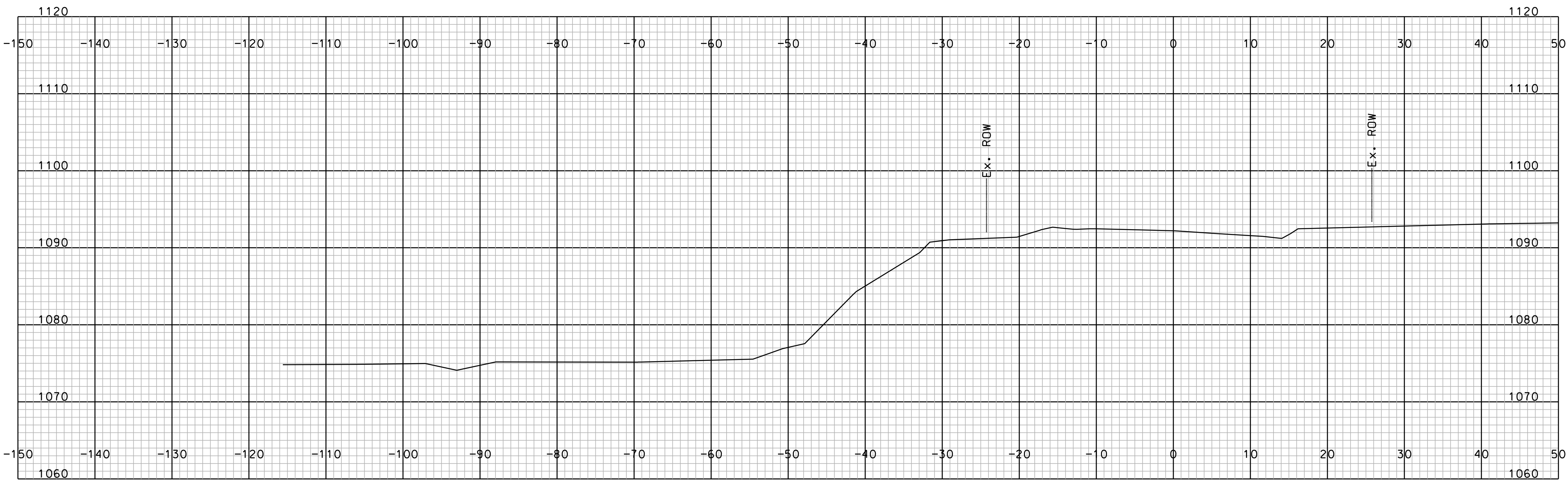


STA. 113+75.00

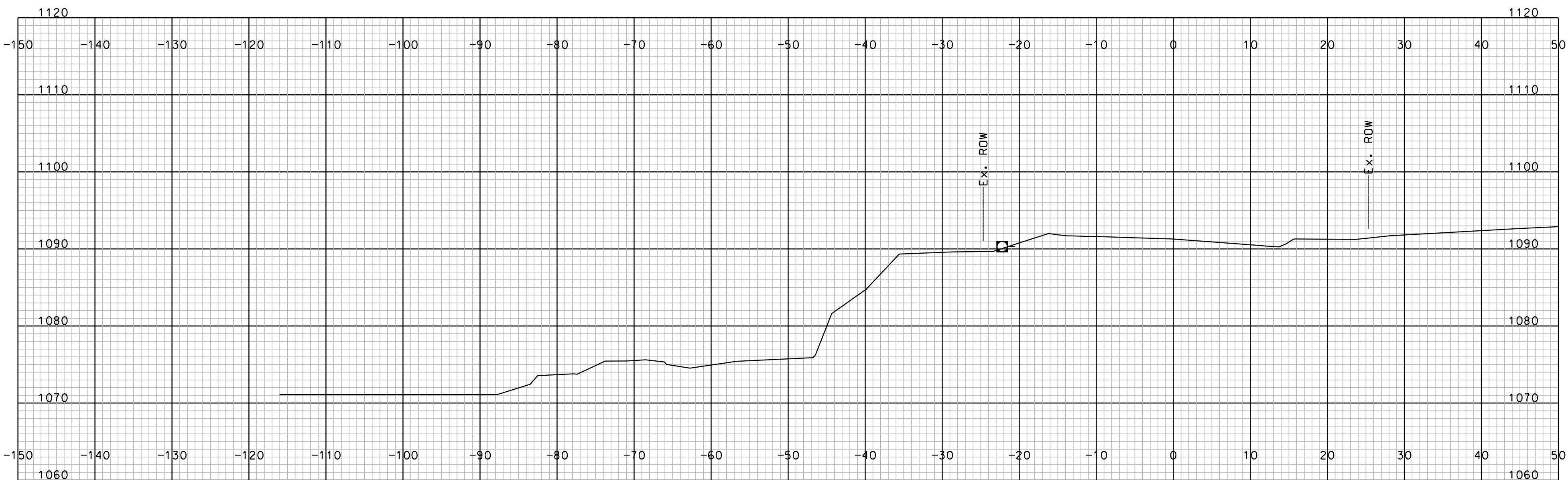
SHEET TOTALS			
COMMON EXCAV.	-	C.Y.	ROCK EXCAV. - C.Y.
FILL	-	C.Y.	MUCK EXCAV. - C.Y.
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 ROAD XS	41738	8	11



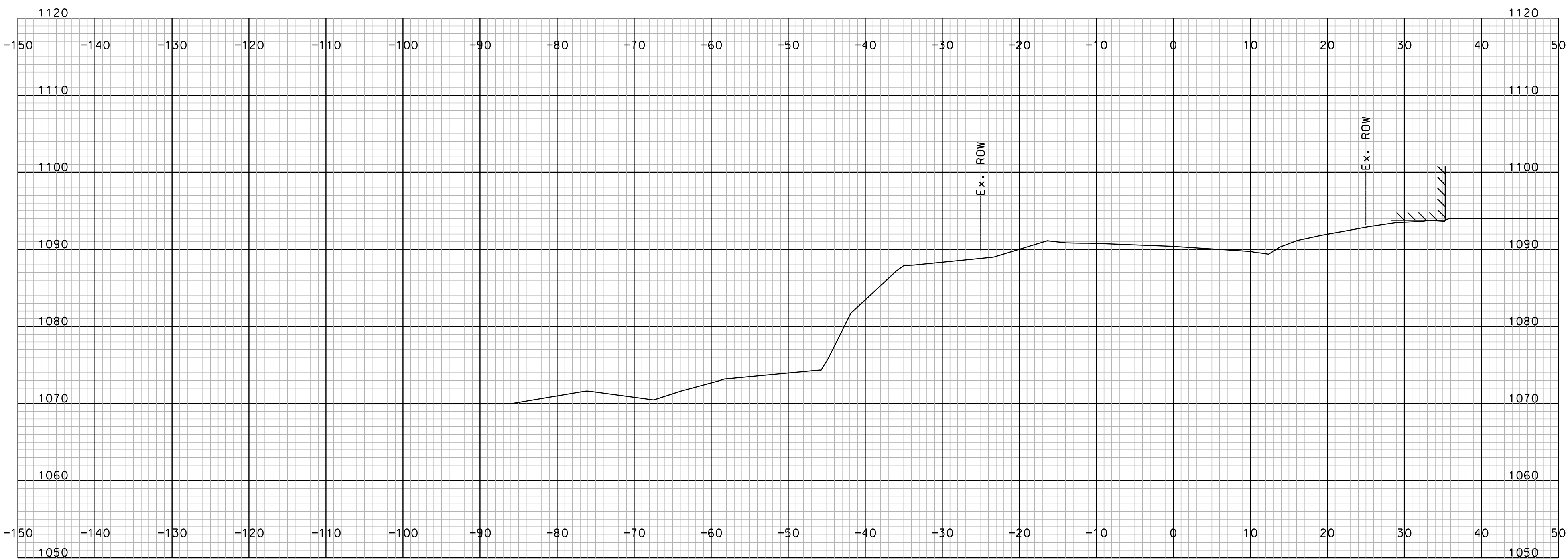
SHEET TOTALS			
COMMON EXCAV.	-	ROCK EXCAV.	- C.Y.
FILL	- C.Y.	MUCK EXCAV.	- C.Y.
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 ROAD XS	41738	9	11



STA. 115+25.00

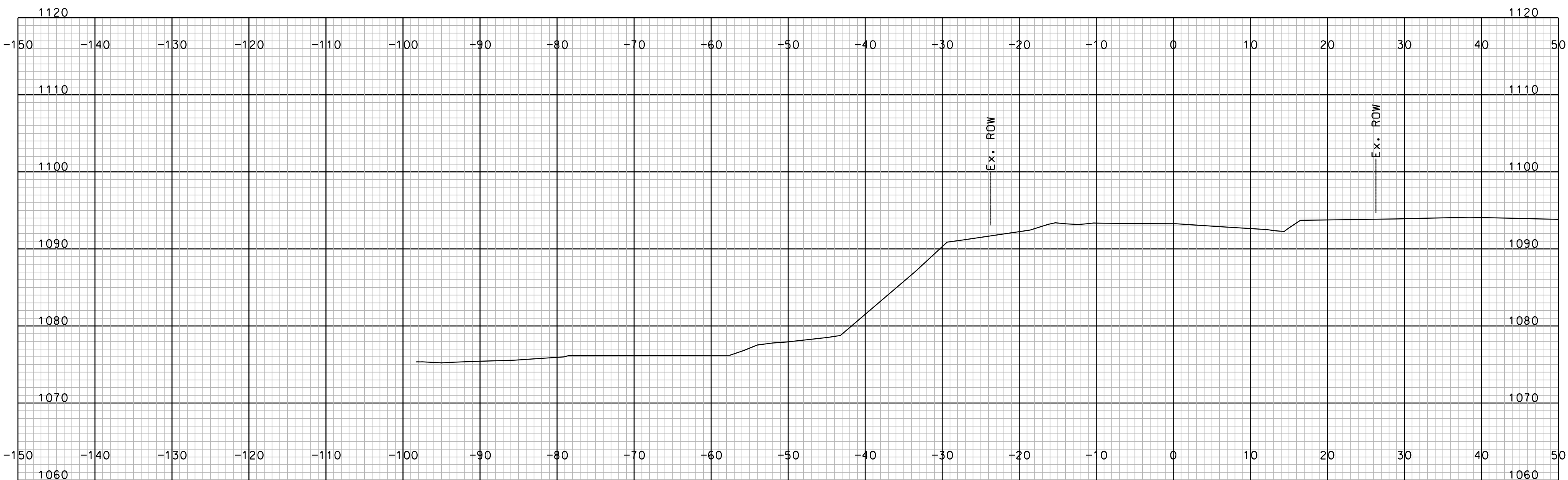


STA. 115+00.00



STA. 114+75.00

SHEET TOTALS			
COMMON EXCAV. _____	C.Y.	ROCK EXCAV. _____	C.Y.
FILL _____	C.Y.	MUCK EXCAV. _____	C.Y.
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 ROAD XS	41738	10	11



STA. 115+50.00

SHEET TOTALS			
COMMON EXCAV. _____	C.Y.	ROCK EXCAV. _____	C.Y.
FILL _____	C.Y.	MUCK EXCAV. _____	C.Y.
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41738 ROAD XS	41738	11	11